

Generation2

Electrical Schematics

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1 EXIT

MEDTEC

MEDTEC AMBULANCE CORPORATION

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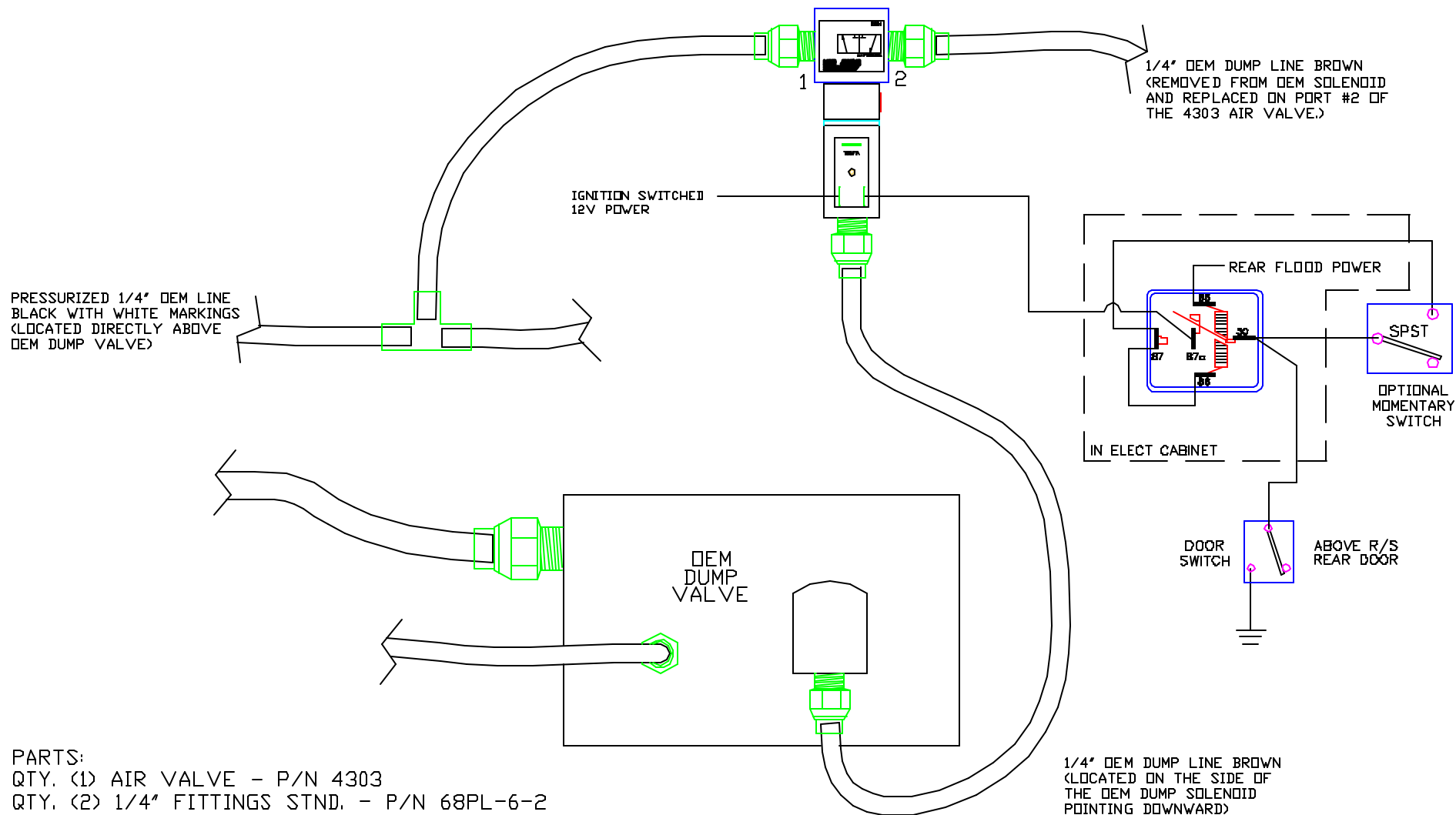
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4303 ELECTRONIC AIR VALVE



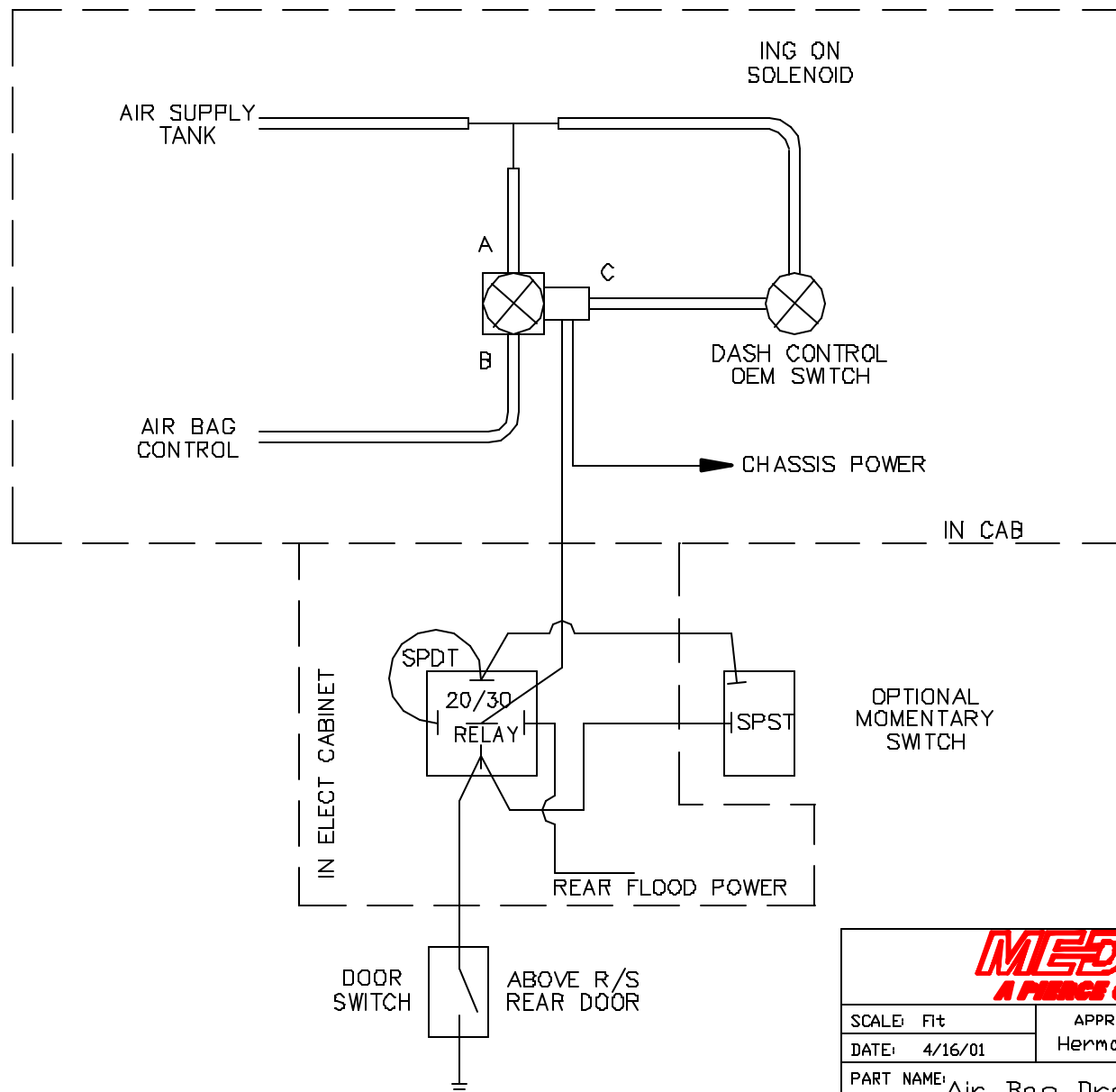
PARTS:

QTY. (1) AIR VALVE - P/N 4303
 QTY. (2) 1/4" FITTINGS STND. - P/N 68PL-6-2
 QTY. (1) 1/4" 'T' SPLICE - P/N 164PL-4
 QTY. (1) 1/4" FITTING SPCL. - P/N 68PL4-10X32
 QTY. (1) 1/4" AIR LINE

DO NOT SCALE	PROJECTION		DESCRIPTION		MEDTEC™				64057 US HWY 25 COLUMBIA, IN 46032 Phone (317) 534-3031 Fax (317) 534-3020						
			MEDTEC TIE IN FOR INTERNATIONAL CHASSIS AIR RIDE DUMP												
	MODEL		2004 INTERNATIONAL MODEL 4300		REFERENCE		1-I.DWG								
	SIZE		THIS DRAWING AND THE INFORMATION CONTAINED THEREON ARE THE EXCLUSIVE PROPERTY OF MEDTEC AMBULANCE CORPORATION. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO WORK UNDER CONTRACT WITH, OR PROPOSALS		TOLERANCES		SCALE N.T.S.								
A				±1/16 ANGLE ±1° UNLESS OTHERWISE SPECIFIED		UNITS: NONE		DRAWN: SAR		DATE: 04/28/04		PART NUMBER		REV.	
						SHEET 1 OF 1		CHECKED: -		DATE: -		M-IN-00-00-01		A	

MEDTEC™

64007 US HWY 35
 GOOMEN, IN 46028
 Phone (317) 894-9931
 Fax (317) 894-9930



MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/16/01		REVISED:
PART NAME: Air Bag Drop For Freightliner		
		DRAWING NUMBER: 1-2.DWG

LOAD CONTROLLER I

By



2.00-129
(11600)
ECN1734

DUAL GAUGE P/N 25651

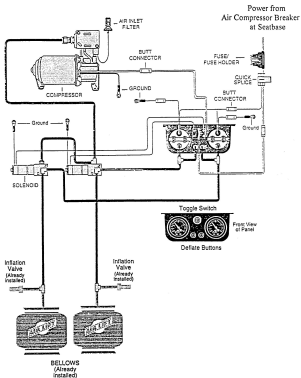


FIGURE 1

INTRODUCTION

Congratulations on your purchase of a Gairning *AIRGLIDE*® drive axle air suspension system. Founded in 1948 by one of the pioneers of air suspensions, Gairning Air Suspensions supplies drive and tag axle air suspension systems to a variety of original equipment manufacturers as well as to the aftermarket industry. The R-Series, trade named *AIRGLIDE*®, are utilized by OEM customers in applications such as recreational vehicles, shuttle bus, trailer, chassis builders, Type I and III ambulances and class 3 through 8 truck applications. This product line now exceeds 25 models that cover all major chassis utilized in the above applications.

What is a Drive Axle Air Suspension

A Gairning *AIRGLIDE*® drive axle air suspension system is a replacement rear suspensions system that consists of an air control system, air springs, trailing arm beams, brackets, and mounting hardware. In general, the air suspension works by maintaining a constant ride height by adjusting the amount air pressure in the air springs. This allows the vehicle to remain level, regardless of loading. By varying the amount of air pressure in the springs, a comfortable ride is maintained whether lightly or heavily loaded. This is the major difference between an air suspension and a conventional steel spring suspension. The steel spring suspension is usually designed for heavily loaded condition and thus yields a harsh ride in lightly loaded conditions. In addition, the steel spring suspension does not maintain a constant ride height under varying load conditions.

By maintaining a constant ride height, the horizontal center of gravity, steering geometry, and even the headlights remain level. The benefits of an air ride are:

1. Driver/passenger comfort,
2. Protection of cargo, chassis and body components,
3. Reduced stress fatigue to chassis frame rails.
4. Greater stability and control.

A unique feature to the Gairning *AIRGLIDE*® drive axle air suspension system is the wear towers and wear blocks. These time proven components prevent unwanted side to side lateral motion without the use of costly and complex track rods.

Air Control Systems

A primary subsystem of a Gairning *AIRGLIDE*® drive axle air suspension system is the air control system. Depending the actual system used, the air control system will provide the ability to automatically control the amount of air pressure in the air springs, thus automatically control the suspension ride height.

The major components of an automatic air control system consist of an air compressor, reservoir tank, height control valve, and air spring. The operation of the system is simple. The compressor supplies air to the tank which operates between 95 - 125 psi. Air pressure from the tank is supplied to the height control valve. The height control valve supplies air to or depletes air from the air spring via a mechanical linkage based on a given load. The pressure changes in the air spring but the height remains the same, thereby giving the optimum ride regardless of load.

A system with a single height control valve supplies both air springs simultaneously while a dual height control valve system supplies each air spring separately. The dual system increases the sensitivity of side-to-side distributions of axle loading. A schematic of each system can be found in the Air Control System Parts List section. See Air Control System - Control Panels and Operation sections.

Located on the bottom of the air tank assembly, is a heated moisture ejector valve. This valve automatically releases accumulated water whenever the air tank pressure drops 15 psi or more. To help eliminate any ice build up, the valve is also heated. However, in most applications, a drop of 15 psi or more in the air tank is not seen regularly. Therefore, a pull cable is provided to manually release accumulated water. The pull cable is usually found near the fuel filler, however, please check with your vehicle's manufacture for the exact location. Regardless of the vehicle application, this pull cable should be operated at least once a day to prevent water damaging the air system.

Optional "kneeler" or exhaust valve(s) may be plumbed between the air springs and the height control valve(s). When power is applied to these valves, they shut off air supply from the height control valve to the air springs and exhaust air from the air springs. As long as power is supplied to the

"kneeler" valve, usually through the "exhaust" position of the "inflate/exhaust" switch, the air springs will remain deflated. With the air springs deflated, the rear end of the vehicle will remain lowered, or "kneeled", with the chassis resting on positive jounce stops. Removing power to the "kneeler" valve allows air to flow from the height control valve to the air springs and shuts off exhaust from the air spring, thus inflating the air springs. The rear end of the vehicle is automatically raised to the proper ride height. Systems with dual height control valves require two "kneeler" valves, one between each air spring and height control valve, if the exhaust option is equipped.

To further improve the ride of an air suspension, Granning offers a dual ping tank kit. One ping tank is added to each side between the air spring and the height control valve, or "kneeler" dump valve if installed. These 200 cubic inch ping tanks effectively increase the volume of the air spring, without having to go to a larger air spring. The spring rate of a system is directly proportional to the volume of the air spring. The larger the air spring volume, the lower the spring rate; thus the better the ride. However, the amount of air flowing between the air spring and ping tank can limit the effective air volume of the system. Therefore, adding larger

and larger ping tanks may not result in significant changes in the suspension spring rate. Granning's ping tank kits have been designed to provide the ideal increase in volume and proper air flow.

A side effect in adding ping tanks is possible increase in air spring inflation times. With a ping tank system installed, the larger volume of air, which improves the spring rate, must be refilled each time the system is "kneeled". Granning's ping tank kits have been designed to minimize this effect, while improving the ride.

Another option available to automatic air control systems is a remote fill kit. This option may be plumbed between the height control valve and the air springs (or "kneeler" exhaust valves if equipped). If for any reason the compressor fails to operate, air, as supplied through any service station air fill, can be added to the air springs for "limp-home" capability. **Caution:** This is only to be used in emergency situations. Components must be serviced to prevent further damage.

Finally, optional warning light sensors or air pressure gauges may be plumbed to one of the air springs.

AIR CONTROL SYSTEM -- CONTROL PANELS

Description of the typical controls are found below.

Note: some original equipment manufacturers (OEM) will use controls integrated into the instrument panel. While the appearance may differ, the operation and description are consistent with below.

Power ON/OFF Switch



Figure 1: Control Panel Assembly, 5016, with Power Only

This master switch turns the power off and on to the compressor and other electrical components of the drive axle suspension. To activate the compressor

and other electrical components, move the switch to "ON".

Exhaust/Inflated Switch (Optional)

If the system is equipped with an optional "kneeler" exhaust valve(s), the control panel will have an Exhaust/Inflated switch. Moving the switch to "Exhaust" position, exhausts all air from the air springs. While the switch is in the "Exhaust" position, the air springs will remain deflated. Exhausting air from the air springs may be required to:



Figure 2: Control Panel Assembly, 4982, with Power and Kneeler Option

- Assist in maintenance.
- Lower the rear of the vehicle to assist in loading.

Caution: Only operate the exhaust feature while the vehicle is parked. Never exhaust the system while the vehicle is in motion.

To inflate the air springs, place the switch in the "Inflated" position.

Air Spring Pressure Gage/Warning Light (Optional)

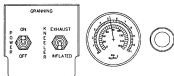


Figure 3: Control Panel Assembly, 4982, with Power and Kneeler Option, and 5703 Buzzer/Gage Option

As an option, the Air Pressure Warning Light/Buzzer kit may be installed. The gage will indicate air tank pressure. If air pressure falls below 20 psi, a warning light and buzzer will activate. Do not operate the vehicle in this condition. The buzzer/light will go off once 40 psi air pressure is reached.

AIR CONTROL SYSTEM – OPERATION

Operation of the Granning *AirGLIDE*® drive axle suspension utilizing an automatic height control system is reached through various control panels. Depending upon options included with the suspension system, the control panel should be operated as follows:

Before operating the vehicle:

- Switch the power to "ON", if "OFF".

- Make sure the Exhaust/Inflate switch is in the "Inflated" position, if the suspension is so equipped.
- If equipped, check that the Low Pressure Warning Light and Buzzer is off.

The vehicle is ready for operation.

To exhaust the system, if the suspension is equipped with an exhaust option:

- Make sure the vehicle is parked.
- Move the Exhaust/Inflate switch to the "Exhaust" position.
- When exhausted, switch the power to "OFF" (if desired).

Although the air suspension master power switch can be left "ON", Granning recommends turning the system off while the vehicle is parked for an extended period to avoid battery drain.

Note: The vehicle will remain kneeled only if the vehicle power remains on. Once vehicle power is shut off, the "kneeler" damp valve will switch back to the inflate position, thereby reinflating the air springs. If the vehicle needs to remain "kneeled" while parked, follow these steps:

- Follow the above steps to exhaust the system. Make sure to turn the suspension power switch to "OFF".
- While the vehicle power is still on and the suspension is off, release the air in the air tank by pulling the manual moisture ejection cable until the sound of air escaping ceases.
- Shut the vehicle's master power off.

To prevent water build up in the air system, operate the manual moisture ejection by pulling, and then releasing, on the pull cable at least once a day. The pull cable is usually found near the fuel filter, however, please check with your vehicle's manufacturer for the exact location. Granning recommends to operation of this manual moisture ejection during vehicle refueling.

MAINTENANCE

General Maintenance	Service to be Performed	Mileage in Thousands									
		3	12	24	36	48	60	72	84	96	
Spring Brace Pivot Connection	Check nut torque	X									
	Inspect for worn bushings		X	X	X	X	X	X	X	X ¹	
	Inspect for signs of looseness due to worn parts		X	X	X	X	X	X	X	X ¹	
Axle Connection	Check "U"-bolt nut torque	X	X	X	X	X	X	X	X	X ¹	
Shock Absorbers ²	Inspect for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings	X	X	X	X	X	X	X	X	X ¹	
Air Springs	Inspect for proper clearance (1" minimum all around)	X									
	Check mount nut torque	X									
	Inspect for signs of chafing or wear	X	X	X	X	X	X	X	X	X ¹	
	Check for air line fitting torque	X									
	Inspect for air leaks using soapy water solution	X									
Height Control Valve Linkage	Inspect for signs of bending, binding, or slippage	X	X	X	X	X	X	X	X	X ¹	
Air Fittings and Air Lines	Inspect for air leaks using soapy water solution	X									
	Inspect for signs of chafing, cracking, or wear	X	X	X	X	X	X	X	X	X ¹	
Wheels ⁴	Check lug nut torque ¹	X	X	X	X	X	X	X	X	X ¹	
Rebound Straps	Check nut torque	X	X	X	X	X	X	X	X	X ¹	
	Inspect for signs of chafing or wear	X	X	X	X	X	X	X	X	X ¹	
	Inspect for signs of possible interference	X									
Wear Block	Inspect for foreign material between the wear block and wear lower mounting premature wear	X	X	X	X	X	X	X	X	X ¹	

¹ Wheel lug nuts must be retightened to proper torque specifications as per the vehicle or chassis manufacturer's Owner Guide.

² Continue to perform specified maintenance every 12,000 miles.

³ Shock absorbers are not a component part of the Granning suspension system. Please see your vehicle's owners manual for instructions on the maintenance of shock absorber items.

⁴ See your vehicle's owners manual for instructions regarding the maintenance of wheels and tires.

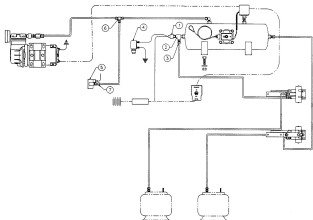
AIR CONTROL SYSTEM PARTS LIST

General Notes

1. Air line tubing should be 1/4" D.O.T. plastic air line tubing.
2. The tubing ends must be cut straight and insert the full depth in to the fittings, otherwise leaks will result. Check all connections for air leaks.
3. Protective air line loom is recommended.
4. All air line fittings to be brass air brake compatible—Parker NTA® or equivalent.

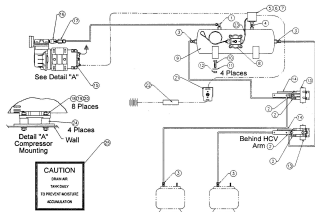
Optional Warning Light/Buzzer/Gage Kit (p/n 5703)

Item	Part No.	Description	Item	Part No.	Description
1	5402	Pressure Sensor, 25/100 psi	5	1869	Gage, Air Pressure 0-100 psi, Liquid
2	0443	Street Tee, 1/4 FPT x 1/4 FPT x 1/4 NPT	6	0197	Union Tee, 1/4 T x 3/4 T x 1/4 T
3	0428	Connector, 1/4 T x 1/4 NPT	7	0151	Connector, 1/4 T x 1/8 FPT
4	5401	Alarm, Dual (Light and Buzzer)			



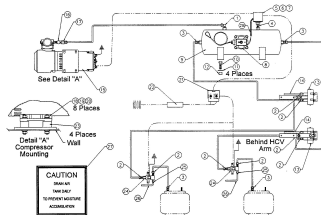
Dual Height Control Valve System (p/n 9483)

Item	Part No.	Description	Item	Part No.	Description
1	9129	Elbow, 90°, 1/4" T x 1/4" MPT	14	—	HCV Exhaust Hose Assembly (Included with 5695)
2	9416	Connector, 1/4" T x 1/8" MPT	15	5188	Compressor
3	9428	Connector, 1/4" T x 1/4" MPT	16	4817	Check Valve
4	9434	Nipple, 1/4" MPT x 1/4" MPT	17	0999	Connector, 1/4" T x 1/4" FPT
5	4398	Pressure Switch	18	8120184	5/16" Spring Lock Washer
6	5064	Grommet, Pressure Switch	19	8120393	5/16" Flat Washer
7	5371	Terminal Connector	20	89428048	5/16"-18, Gr. 8, Nut
8	5442	Heated Moisture Ejector Valve	21	Special	Control Panel (see previous sections)
9	5099	Air Tank	22	7465	60 Amp Circuit Breaker
10	8455018	1/2"-20 x 1 1/2", Gr. 8, Hex Head Bolt	23	3372	5/16" Loom
11	8183523	1/2" Spring Lock Washer	24	3392	Vibration Isolator
12	390	1/2"-20, Gr. 8, Hex Nut	25	6700	Warning Label
13	5688	Height Control Valve			



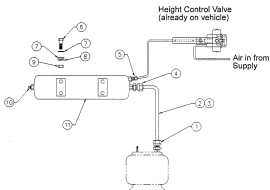
Dual Height Control Valve with Dump Valve System (p/n 9470)

Item	Part No.	Description	Item	Part No.	Description
1	0128	Elbow, 90°, 1/4" T x 1/4" MPT	15	5188	Compressor
2	0416	Connector, 1/4" T x 1/8" MPT	16	4017	Check Valve
3	0428	Connector, 1/4" T x 1/4" MPT	17	5599	Connector, 1/8" T x 1/4" FPT
4	0434	Nipple, 1/4" MPT x 1/4" MPT	18	8120214	3/16" Spring Lock Washer
5	4358	Pressure Switch	19	8120393	3/16" Flat Washer
6	5094	Gaugeset, Pressure Switch	20	89429048	3/16"-18, Or. 8, Nut
7	5171	Terminal Connector	21	Special	Control Panel (see previous sections)
8	5442	Heated Moisture Ejector Valve	22	7403	40 Amp Circuit Breaker
9	5099	Air Tank	23	3392	Vibration Isolator
10	8405028	1/2"-20 x 1 1/2", Or. 8, Hex Head Bolt	24	3103	3 Way Normally Open (Dump Valve/Keeper)
11	8103033	3/32" Spring Lock Washer	25	4115	Connector, 3/16" HBS x 1/8" MPT
12	190	1/2"-20, Or. 8, Hex Nut	26	4120	3/16" Fitting
13	5668	Height Control Valve	27	4700	Warning Label
14	—	HCV Exhaust Hose Assembly (Included with 5668)	28	3372	3/16" Lawn



Ping Tank Kit (p/n 9593)

Item	Part No.	Description	Item	Part No.	Description
1	0627	Connector, 1/2 T x 1/4 MPT	7	89415143	1/2" Flat Washer
2	6247	Tubing, 1/2" D.O.T.	8	8120384	1/2" Spring Lock Washer
3	6248	Loose, 3/8"	9	8120371	1/2"-38, Or. 5, Hex Nut
4	0635	Connector, 1/2 T x 1/2 MPT	10	8141	Plug, 1/4" Square Head
5	0428	Connector, 1/4 T x 1/4 MPT	11	8214	Ping Tank, 200 cu. in., 4" dia.
6	8455028	1/2"-20 x 1 1/2", Or. 8, Hex Head Bolt			



Notes:

1. For best results, the ping tank should be mounted as close to the air spring as possible.
2. If the air system contains "kneeler" dump valves, the above tank system must be inserted between the "kneeler" valve and the air spring.

HEIGHT CONTROL VALVE AND LINKAGE MAINTENANCE

If height control valve adjustment is required, please follow the listed steps:

1. Secure the vehicle by blocking all wheels.
2. Determine the correct ride height of the suspension. See Suspension Parts List section for a listing of correct ride heights. Note: The ride height is measured at the center of the axle to the top of the frame behind the axle (see Suspension Part List drawing for exact location).
3. Loosen the lock clamp on the upper end of the linkage rod.
4. Slide the connector up or down the linkage rod to achieve the correct ride height. The height control valve arm must be in a horizontal orientation after the system has stabilized and the correct ride height is achieved.
5. Retighten the lock clamp.

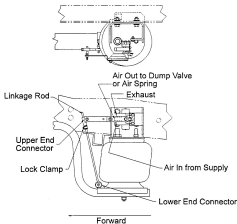


Figure 4: Height Control Valve

TROUBLESHOOTING

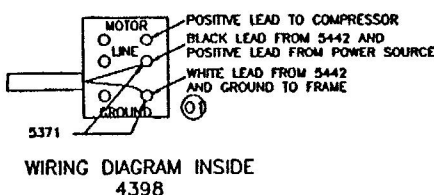
Drive Axle Suspension System--General

Symptoms	Possible Causes	Remedies
Excessive vehicle roll or lateral movement (side to side movement)	Loose or worn front pivot connection(s) Worn out front pivot bushing(s) Axle "U"-bolts loose Worn or failed wear blocks	Tighten (see previous torque chart) or replace as required Replace as required. Tighten (see previous torque chart) or replace Replace
Hard ride or axle bottoming out	Air suspension not turned on Incorrect ride height Vehicle overloaded Defective height control valve(s) Height control linkage disconnected or damaged Improper rebound strap/rebound strap location	Turn on air suspension Adjust to current ride height (see previous section) Reduce drive axle load. Replace height control valves as required Reattach or replace as required Replace with correct rebound strap. Note: Do not relocate rebound strap without prior authorization from Gearing Air Suspension.
Tire hop or poor handling	Loose or worn shock absorbers Driveline retarder (if equipped) overtorqued or improperly set.	Shock absorbers are not a component part of the Gearing suspension system. See your vehicle's owners manual for instructions regarding the maintenance of the shock absorbers. Check driveline retarder disconnection or with the vehicle manufacturer for proper sizing or setting of the retarder. Gearing does not supply a driveline retarder.
Prematurely worn front tires	Incorrect ride height Rear axle brake proportioning valve not disabled	Adjust to current ride height (see previous section) Disable rear axle brake proportioning valve with kit 5698.

Air Control System

Symptoms	Possible Causes	Remedies
Air compressor runs excessively	Air leak	Inspect all air lines, fittings, and air springs with a soapy water solution. Repair, retighten, or replace as required. Note: Plastic air lines must be cut square. See Air Control System Parts List (General Notes) for additional notes.
	Internal air leak in height control valve.	Insert exhaust tube into a cup of water and examine for bubbles. This will show evidence of both inlet and exhaust valve leaks. Replace components.
	Air tank pressure switch limits set incorrectly	Reset to instructions on inside cover of pressure switch located on the air tank or replace pressure switch. Limits should be 85 to 125 psi.
	Moisture ejector valve stuck open	Check and replace if necessary
	Check valve installed incorrectly	Arrow should point away from the air compressor head. Correct if necessary.
	Dump valve(s), or "knocker(s)", leaking	Check and replace if necessary
Air compressor will not start	Height Control Valve stuck in the exhaust position.	Locate obstruction and remove or eliminate interference.
	Inline fuse burnt or circuit breaker tripped	Replace or reset
	Pressure switch contacts burnt	Inspect and correct or replace as required
	Air compressor motor burnt out	Inspect and replace as required
	Disconnected or broken wire	Inspect and correct or replace if necessary

ELECTRICAL CONNECTIONS FOR THE AIR COMPRESSOR ON EMERGENCY VEHICLES SHOULD BE MADE "DIRECT" TO THE POWER SUPPLY. THIS ALLOWS THE COMPRESSOR TO KEEP THE AIR SYSTEM FULLY CHARGED.



Δ COMPONENT PARTS OF #5098 COMPRESSOR ASSY.
 * COMPONENT PARTS OF #5455 TANK ASY. W/M.E.
 ● COMPONENT PARTS OF #4982 CONTROL PANEL.

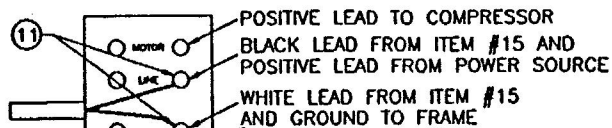
- WIRING TO COMPRESSOR FROM TOGGLE SWITCH (TO INCLUDE PRESSURE SWITCH) SHOULD BE A MIN. OF AWG. NO. 10 STRANDED.
- ELECTRICAL WIRES & AIR LINES TO BE ROUTED THROUGH LOOM
- TUBING TO BE 1/4" O.D. PLASTIC TUBING.
- TOGGLE SWITCHES TO BE INSTALLED (SLOT DOWN) IN THE POSITION SUCH THAT DOWN IS OFF.
- DO NOT OVER TIGHTEN COMPRESSION FITTINGS

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02 12-26-96		OLD TITLE BLOCK	NEW TITLE BLOCK	Telephone		Extensions		GRAMMING AIR SUSPENSIONS Division of Fluidyne, Inc.		P.O. Box 800 Brockton, MA 01923	
01	12-26-96	BLACK	WHITE	Revised 201	06	06	06				
N	6/13/95		CORRECTED VIEW	0.660	K	G1129	EJR				
M	9/12/93	4967		Revised 202	L	G1129	WSS			AIR CONT. - DUAL HCV W/KNELER	
L3	5/20/94		ADDED NOTES	0.030	M	G1578	WSS				
L1	5/20/94		ADDED \$700	Revised 203	M	G1598	WSS				
K	4-12-94		DELETE 5908	Revised 204	O	G1872	LLG				
ITEM	DATE	WAS	CHANGED TO	1*							
				Revised 205	TAG		Revised 206	N/A	Revised 207	NOTED	
				Revised 206			Revised 207	5/28/90	Revised 208	9470	

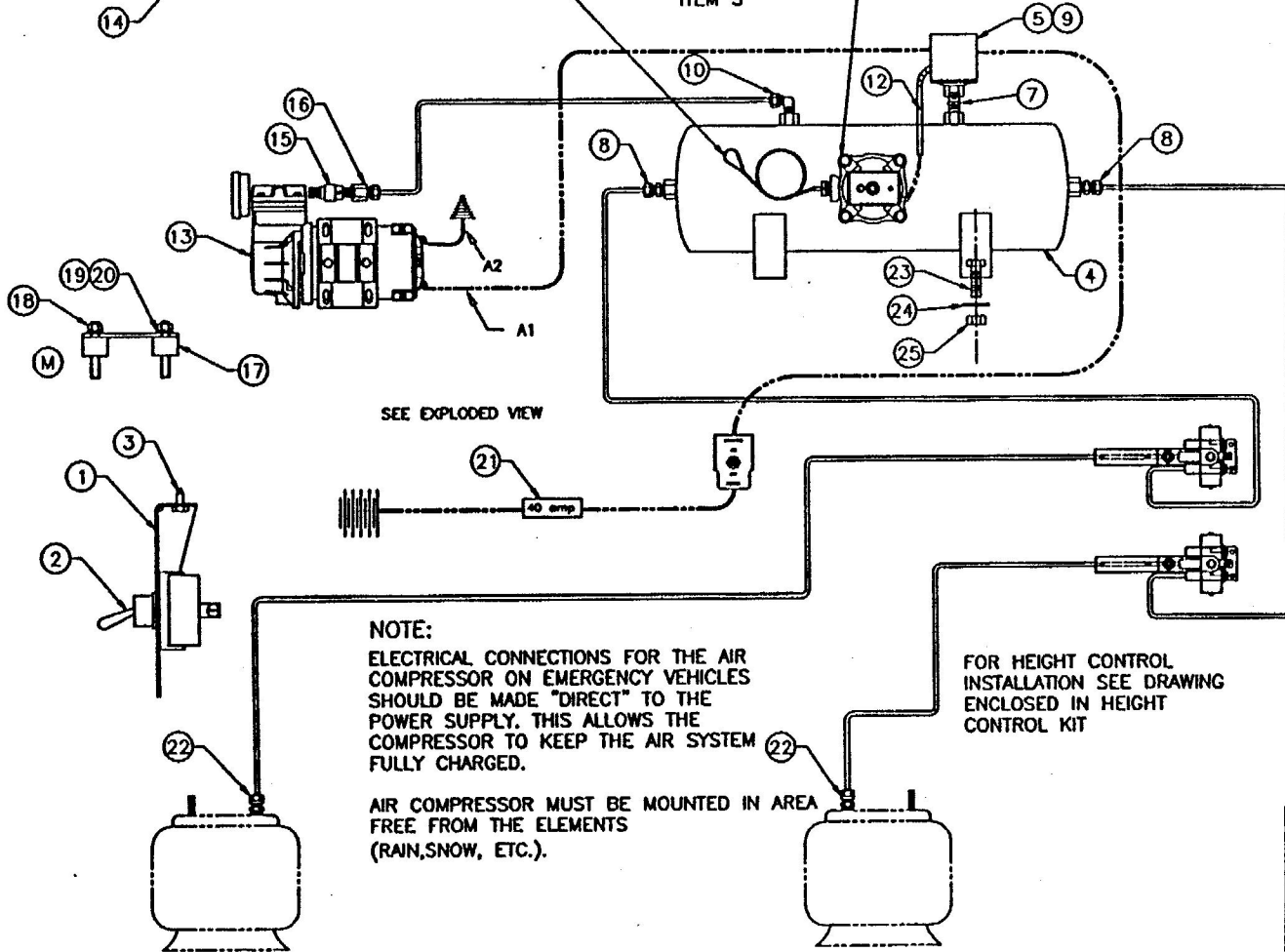
60" MANUAL DRAIN CABLE
POSITIONED TO PULL 90° TO DRAIN VALVE
NOTE:
CUSTOMER TO PROVIDE BRACKET FOR DRAIN
CABLE.

NOTE:
ATTACH CAUTION LABEL TO VEHICLE
BODY WHERE MANUAL DRAIN CABLE
IS ATTACHED.



WIRING DIAGRAM INSIDE
ITEM 5

NOTE:
SPITTER VALVE LOCATED AT
BOTTOM OF TANK.



BILL OF MATERIAL			
ITEM	QTY	PART #	DESCRIPTION
1	1	4910	CONTROL PANEL
2	1	4981	TOGGLE SWITCH
3	2	89426623	SCREW-#6-20x3/8
4	1	5099	TANK ASSEMBLY
5	1	4398	PRESSURE SWITCH
6	1	5442	HEATED SPITTER VALVE
7	1	0424	1/4MPT NPPLE
8	2	0428	CONNECTOR
9	2	5094	WIRE GROMMET
10	1	0129	ELBOW
11	2	5371	INSUL. TERMINAL RING
12	7	5372	5/16 10 WIRE LOOM
13	1	6437	COMPRESSOR
14	1	6700	WARNING LABEL
15	1	4017	CHECK VALVE
16	1	0599	FEMALE CONNECTOR
17	4	5392	VIBRATION ISOLATOR
18	8	89429048	5/16" HEX NUT
19	8	8120393	WASHER 5/16 FLAT
20	8	8120214	5/16" LOCKWASHER
21	1	7463	CIRCUIT BREAKER
22	2	0428	CONNECTOR
23	4	8455028	1/2-20x1 1/2 HHB GR.B
24	4	8103323	1/2 LOCKWASHER
25	4	100	1/2-20 HEX NUT GR.B
-	1	09483	INSTALLATION DRAWING

○ COMPONENT PARTS OF 5018 CONTROL PANEL
□ COMPONENT PARTS OF 5455 TANK ASSEMBLY

INSTALLATION NOTES:

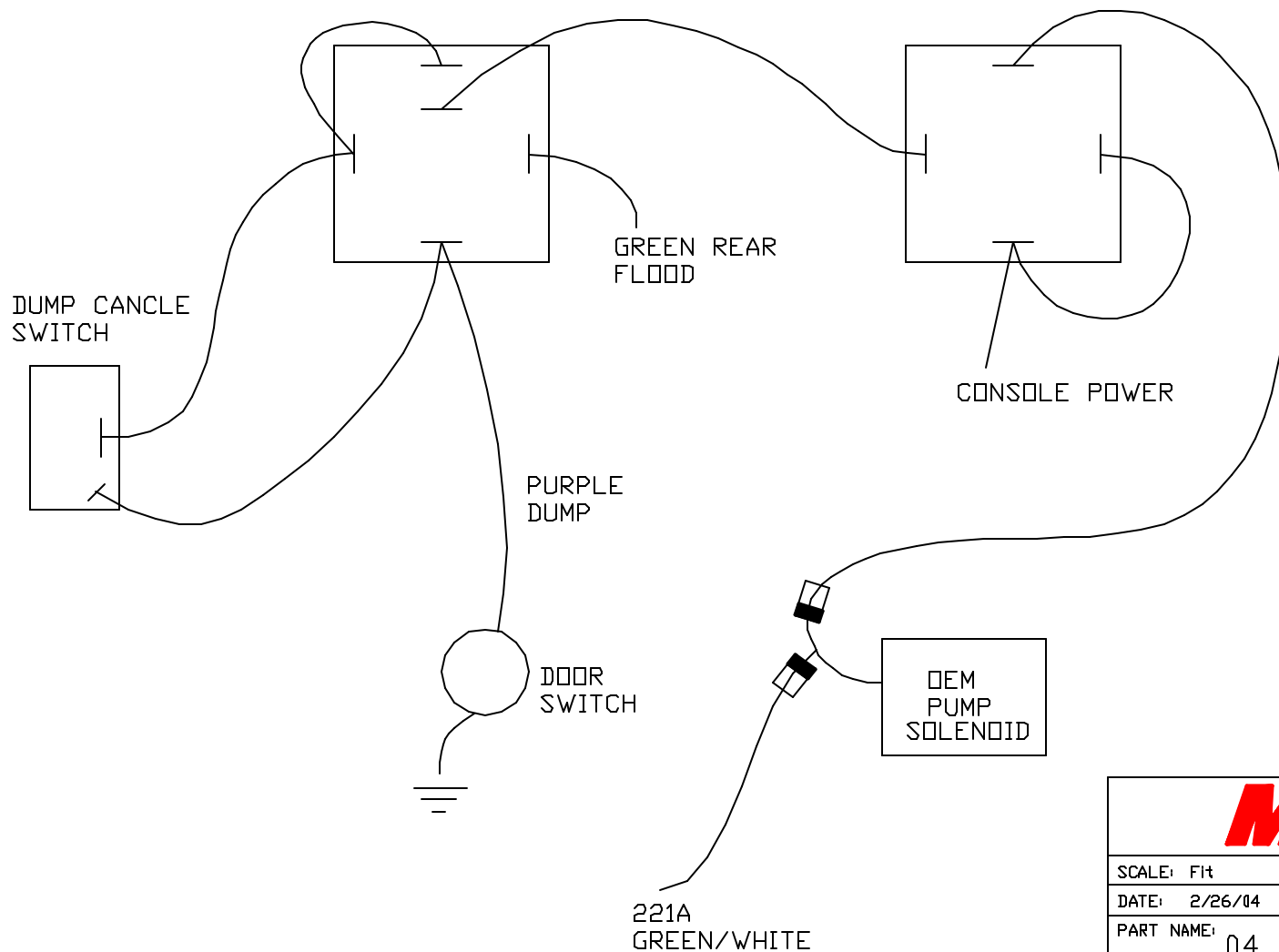
- WIRING TO COMPRESSOR FROM TOGGLE SWITCH (TO INCLUDE PRESSURE SWITCH) SHOULD BE A MINIMUM OF AWG. NO. 10 STRANDED.
- TUBING TO BE 1/4" D.O.T PLASTIC TUBING.
- TOGGLE SWITCH TO BE INSTALLED (SLOT DOWN) IN THE POSITION SUCH THAT DOWN IS OFF.
- DO NOT OVER TIGHTEN COMPRESSION FITTINGS
- ALL AIR LINE FITTINGS TO BE APPLIED WITH PERMATX SEALANT OR EQUIVALENT

N2	12-26-96	OLD TITLE BLOCK	NEW TITLE BLOCK
N1	12-26-96	BLACK	WHITE
M	9/21/95		ADDED ISOLATORS
L	9/21/95	5098 ASY	6437
K	9/12/95	4967	7463
ITEM	DATE	WAS	CHANGED TO

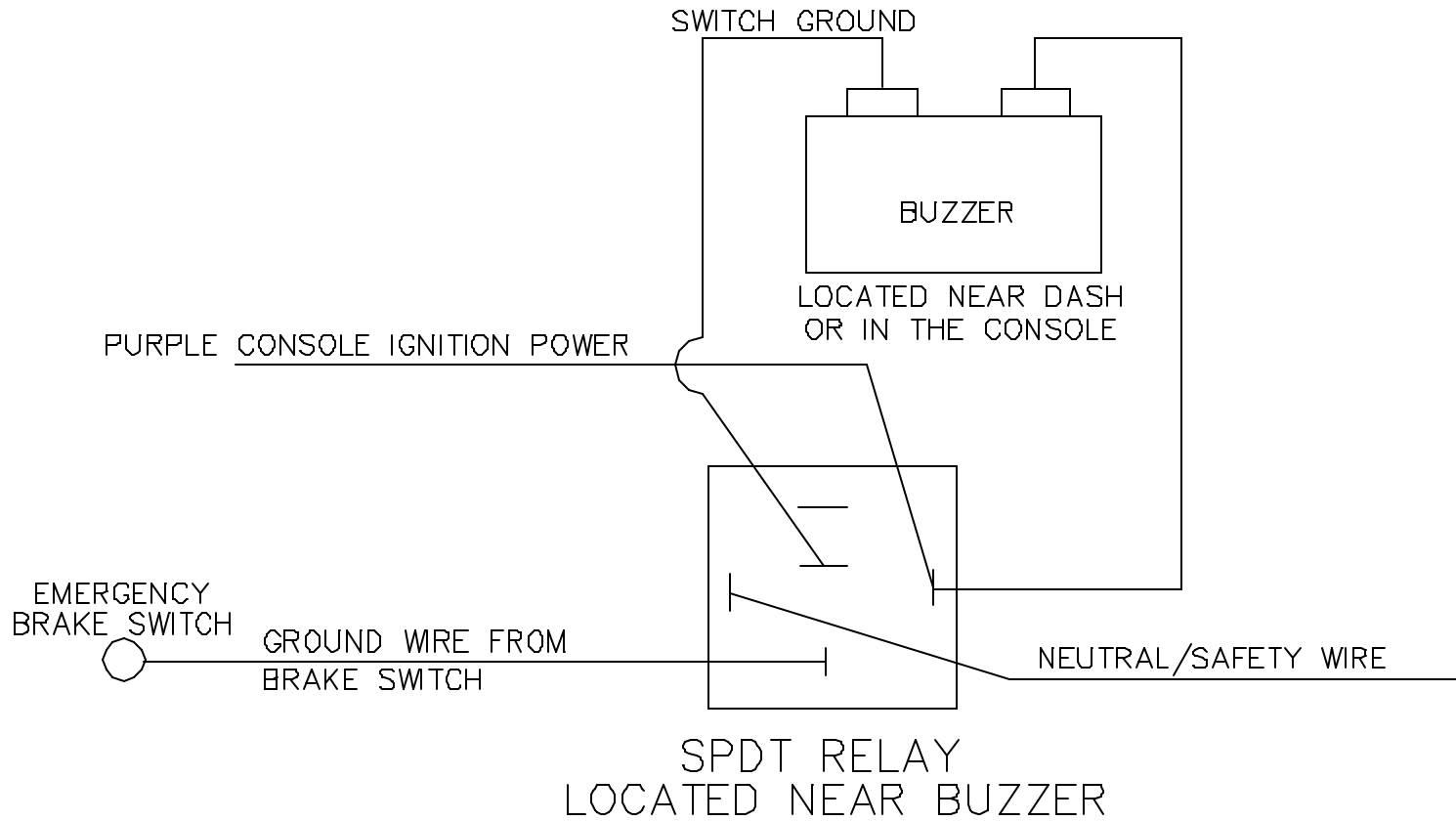
Granning Air Suspensions, Inc. claims proprietary rights in the information disclosed on this drawing or document. It is not to be reproduced or used in manufacture without the written permission of Granning Air Suspensions, Inc.

Tolerances		Revisions		Granning Air Suspensions		P.O. Box 800	
		No.	Rev #	By	Division of Fluidrive, Inc.		Brookston, MI 49723
± .060		K	G1578	MSS	AIR CONTROL KIT - DUAL		NOTED
± .001		L	G1600	MSS			
± .030		M	G1599	MSS			
Angular		N	G1872	LLG	Drawn	KB	Scale
± 1°					DATE	6/12/91	Grading No.
					Rev'd		9483

1-5



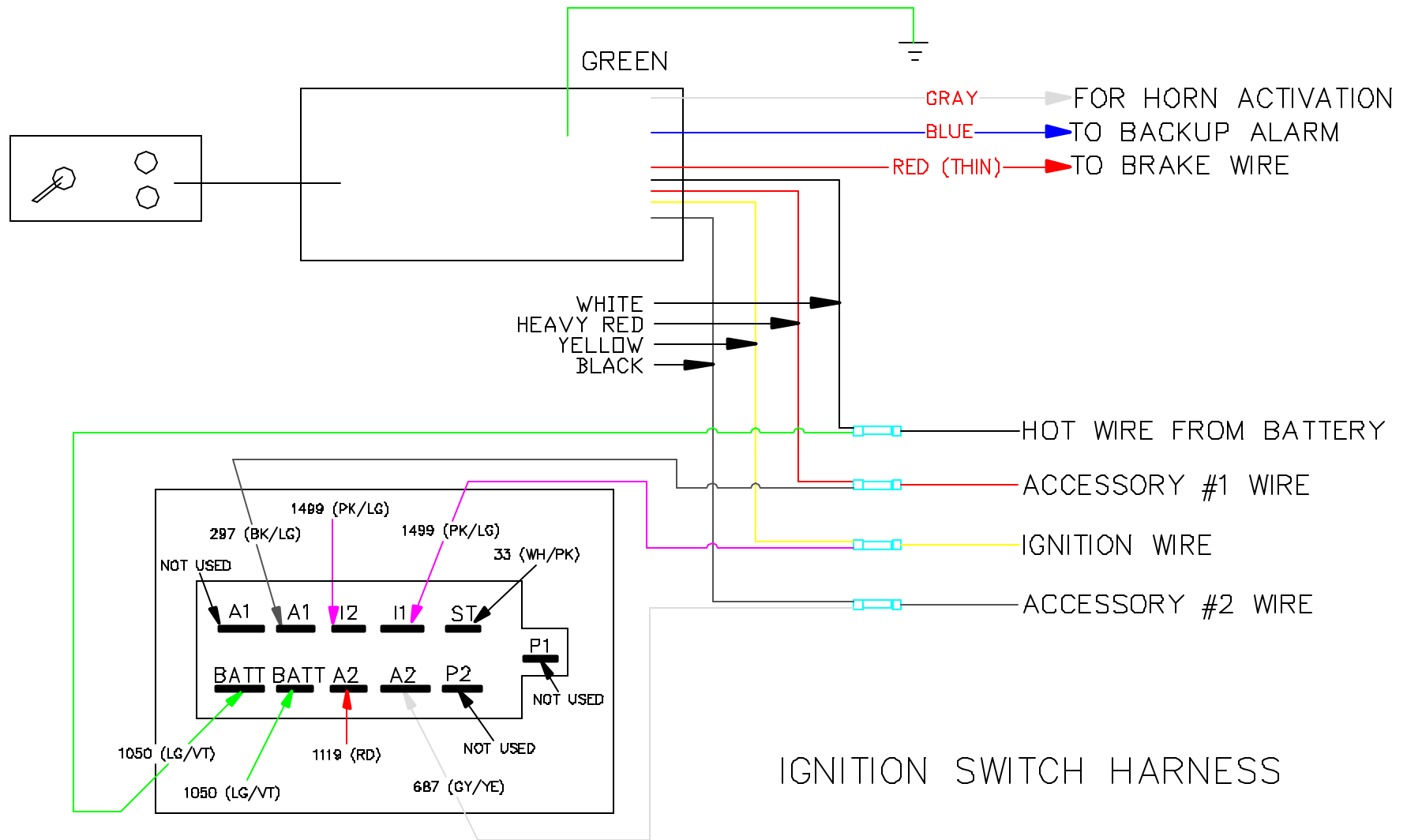
MEDTEC™		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 2/26/04	Herman Mullet	REVISED:
PART NAME: 04 M2 FREIGHTLINER DUMP		
		DRAWING NUMBER: 1-5



MEDTEC
A PIERCE COMPANY

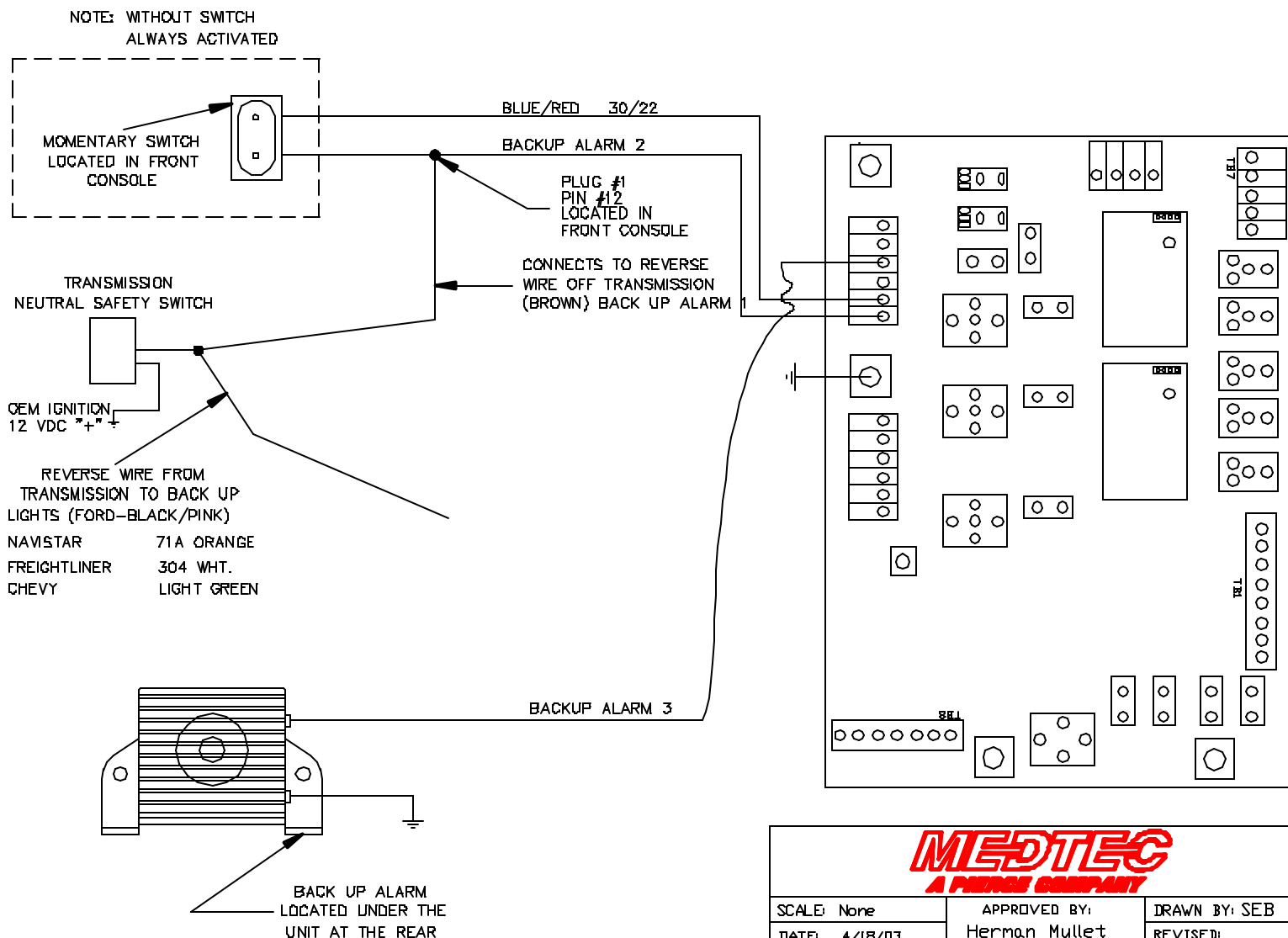
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/16/01		REVISED:
PART NAME: Emergency Brake Buzzer When Unit is in Gear		
		DRAWING NUMBER: 2-1.DWG

REV	DATE	BY	ECN	REV	DATE	BY	ECN	REV	DATE	BY	ECN
A	-	-	-	-	-	-	-	-	-	-	-



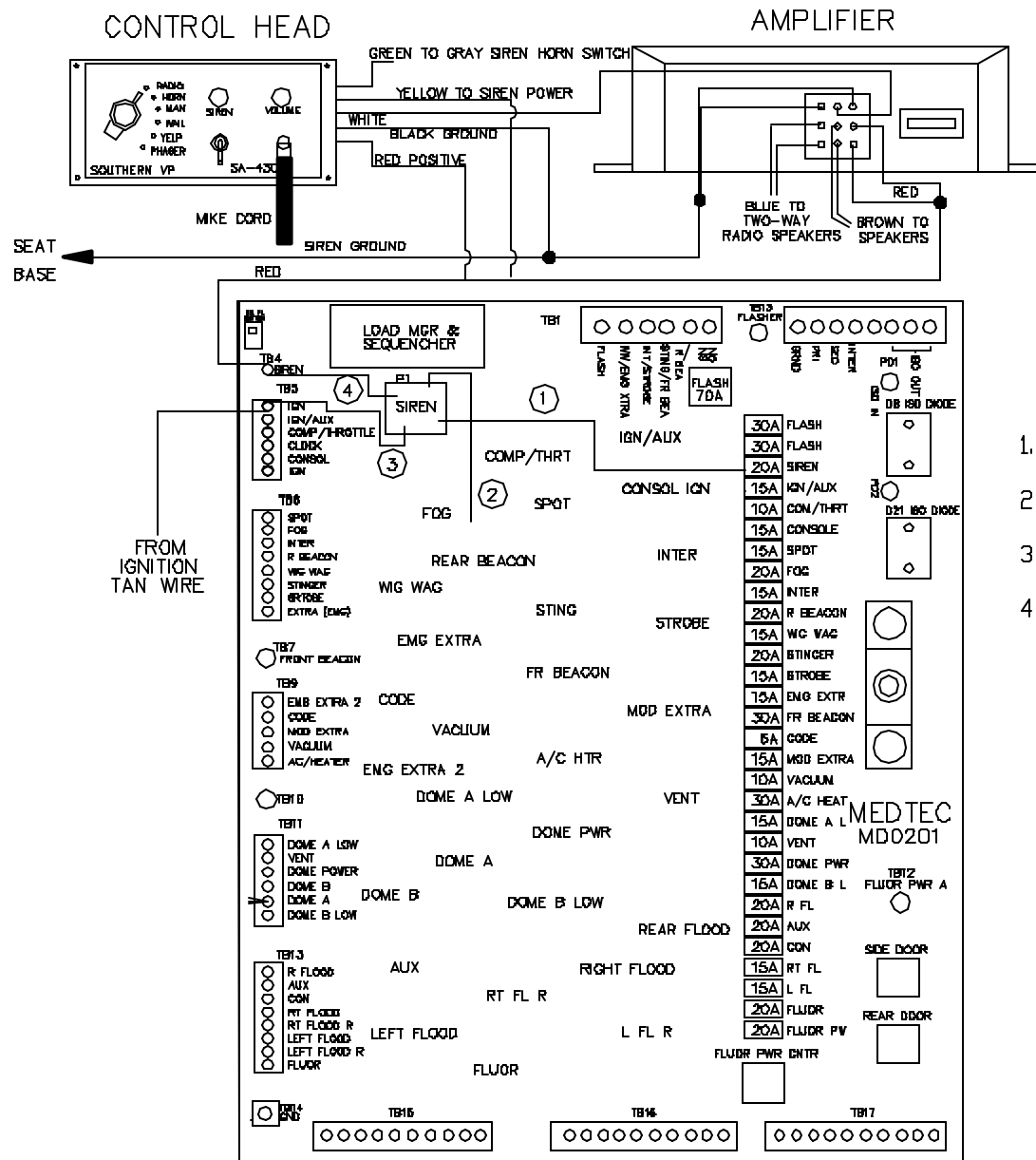
DO NOT SCALE	PROJECTION		DESCRIPTION		MEDTEC™		64007 US HWY 25 GOOMEN, IN 46028 Phone (874) 894-9931 Fax (874) 894-9930					
		Antitheft Ignition Switch Harness										
	MODEL	REFERENCE	2-2.dwg									
	2004 Ford E and F Series											
	SIZE	THIS DRAWING AND THE INFORMATION CONTAINED THEREON ARE THE EXCLUSIVE PROPERTY OF MEDTEC AMBULANCE CORPORATION. IT SHALL NOT BE COPIED OR DUPLICATED IN ANY MANNER, NOR SHALL IT BE SUBMITTED TO OUTSIDE PARTIES FOR EXAMINATION WITHOUT OUR WRITTEN CONSENT. IT IS LOANED FOR USE WITH REFERENCE TO WORK UNDER CONTRACT WITH OR PROPOSALS SUBMITTED TO MEDTEC AMBULANCE CORPORATION.		TOLERANCES	SCALE	N.T.S.						
A			±1/16	UNITS:	NONE	DRAWN:	SAR	DATE:	04/28/04	PART NUMBER	2-2.DWG	REV. A
			ANGLE ±1°			CHECKED:	-	DATE:	-			
			UNLESS OTHERWISE SPECIFIED	SHEET	1 OF 1							

2-3



MEDTEC
A PIERCE COMPANY

SCALE: None	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/18/03		REVISED:
PART NAME: Backup Alarm		
		DRAWING NUMBER: 2-3.DVG





**MANUFACTURERS OF EMERGENCY
AND COMMERCIAL VEHICLE LIGHTING**

5132 37th AVE.
P.O. BOX 208
HUDSONVILLE, MI 49426

800-338-7337 • 616-669-0230 • Fax 616-669-3475 • E-mail: postoffice@soundoffinc.com • Website: www.soundoffinc.com

IGNITION SECURITY SYSTEM (ETISSO)

INSTALLATION

NOTE

If vehicle is currently (or will be) equipped with a tail light flasher system other than a Sound Off Flashback, please contact Sound Off, Inc. Technical Department for a special code installation kit. This kit will prevent the operation of non-Sound Off tail light flashers from shutting off the engine and the accessories when I.B.S. is activated.

MOUNTING: Mount the ISS box (within wire length) near the steering column. Mount the ISS Control Switch in a convenient location.

CAUTION

Do Not over tighten the mounting screws on either the ISS box or the control switch to prevent damage to the mounting tabs.

HEAVY WHITE WIRE: Locate the heavy wire going to the vehicle's ignition switch from the battery. "T" or tap the ISS heavy White wire into it.

HEAVY YELLOW WIRE: Locate the ignition run wire from the output of the vehicle ignition switch. "T" or tap the heavy Yellow wire into it.

HEAVY BLACK WIRE: "T" or tap the heavy Black wire into the accessory wires coming from the vehicle ignition switch.

HEAVY RED WIRE: "T" or tap the heavy Red wire into the blower motor circuit.

GREEN WIRE: Connect to a convenient, reliable ground.

RED/BLACK WIRE: Locate the vehicle brake light switch and "T" or tap the Red/Black wire to the cold side of the switch (towards the brake lights).

BLUE WIRE: Locate the backup wire leading from the neutral safety switch in the transmission and "T" or tap the Blue wire to the cold side of the switch (towards the back-up lights).

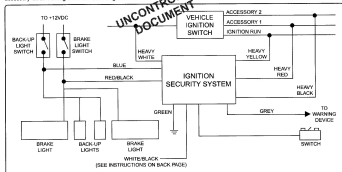
Note:- The backup light switch is located on top of the steering column next to the fire wall on G.M. cars and on the transmission in both Ford and Chrysler. The wire from the backup switch on both the Ford and the Chrysler are accessible in the engine compartment on the passenger side next to the fire wall.

GREY WIRE: Provides a positive output voltage when ISS is tripped to power up a head light flasher or some other warning device.

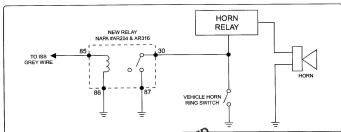
NOTE

MAXIMUM output on grey wire is 6 amps.

The Grey wire can also be used to power up the vehicles horn with the use of an extra relay (see diagram on reverse side).



WIRING SCHEMATIC



Typical Ground Side Switch Horn System

NOTE

DO NOT use the ISS on 2000 and newer Impala and Monte Carlo vehicles. The ISS is not compatible with the vehicle's body computer.

SPECIAL INSTALLATION INSTRUCTIONS FOR '95 & newer FORD CROWN VICTORIA

1995 and newer Ford Crown Victoria - connect the Wiring Backlogs to a 10 amp fuse. Then connect the other end of the fuse to the field coil of the alternator. (Pink/Black Wire on Ignition Switch)

NOTE

To prevent the "CHECK ENGINE" light from coming on in 1997 and newer S-10 Trucks, Blazers, CK Trucks, and Tahoes, the white wire (old #3) between the ignition switch and fuse #20 (trans fuse) must be powered when the Ignition Security Switch is activated.

OPERATING INSTRUCTIONS

1. Start the vehicle.
2. To activate the I.S.S.: Push the switch down (momentarily). The switch will automatically return to the neutral position and a red indicator light will come on.
3. Turn the ignition switch to the OFF position and remove key. The vehicle will remain running.

NOTE

If the brake pedal is touched or the transmission is shifted through reverse, the I.S.S. will immediately kill the engine as well as the accessories. The only way to restart the engine is with the ignition key.

4. To deactivate the I.S.S.:

Simply reinsert key and turn ignition switch to the RUN position and either shift the vehicle through Reverse or step on the Brake.

Optional Horn Alarm:

Immediately after the I.S.S. has been activated, push the switch to the up position. An Amber Indicator light will then come on. To deactivate the Horn Alarm, return the switch to the center position.

NOTE

DO NOT activate vehicle brake during preheat or ignition warm-up on vehicles with diesel engines.

WARRANTY

Sound Off, Inc. warrants the ET1850 Electronic Ignition Security System for 1 (one) full year from the date of purchase to the original purchaser against any manufacturer defects or workmanship. This warranty applies only to units installed according to manufacturer's installation instructions and operated within the units specifications.

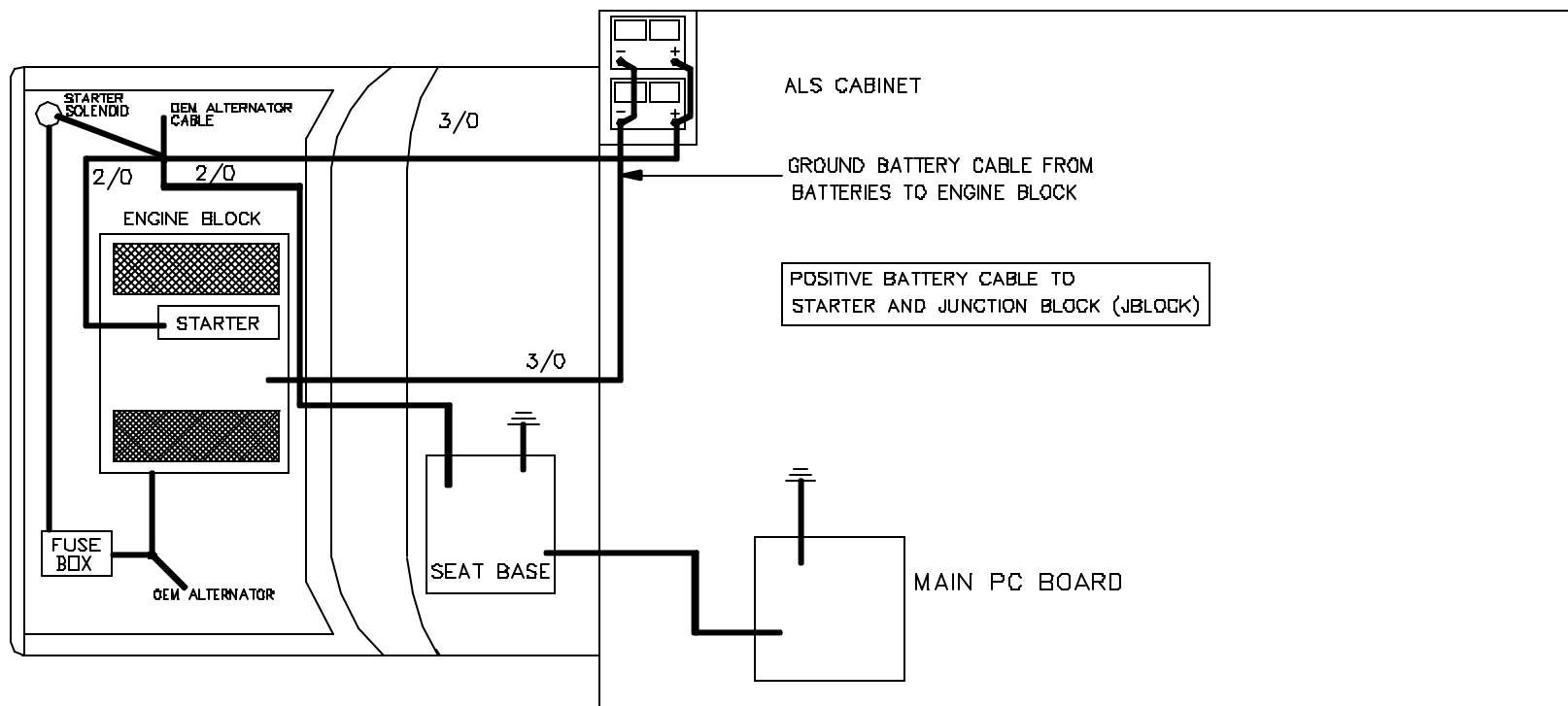
Warranty is void if the unit was installed incorrectly or maliciously damaged.

All warranty claims must be accompanied by a dated proof of purchase.

Sound Off, Inc. retains the right to be the sole mediator of what constitutes defects in performance or manufacturing.

ET1850MCTP96-1-00

BATTERIES IN LOWER SECTION

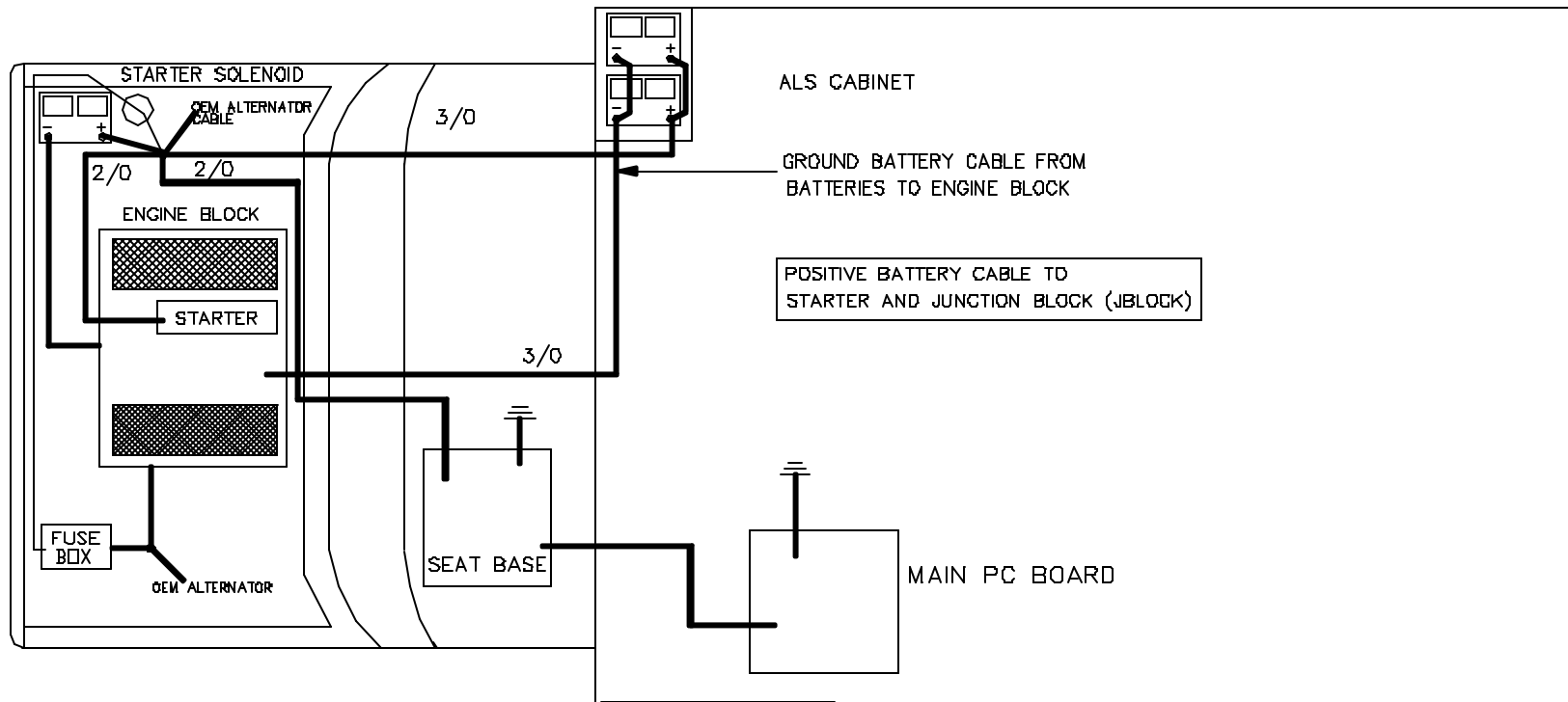


MEDTEC
A PIERCE COMPANY

SCALE: FH	APPROVED BY:	DRAWN BY: RWB
DATE: 8/18/99	Herman Mullet	REVISED:
PART NAME: Main Battery Cable Wiring Under ALS Compartment		
		DRAWING NUMBER: 3-1.DWG

3-2

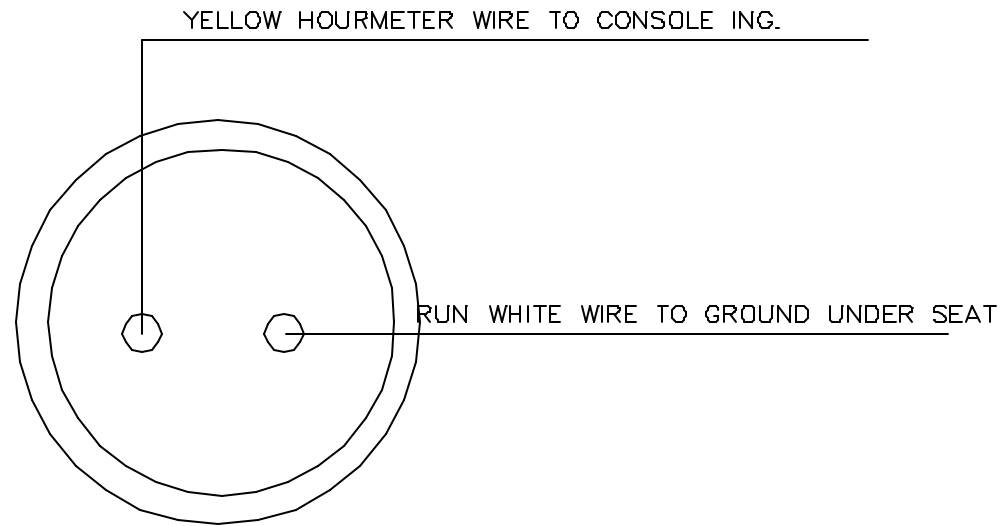
BATTERIES IN LOWER SECTION



MEDTEC
A FERRIS COMPANY

SCALE: FH	APPROVED BY:	DRAWN BY: RWB
DATE: 8/16/99	Herman Mullet	REVISED:
PART NAME: Main Battery Cable Wiring Under ALS Compartment/3rd Under Hood		
		DRAWING NUMBER: 3-2.DWG

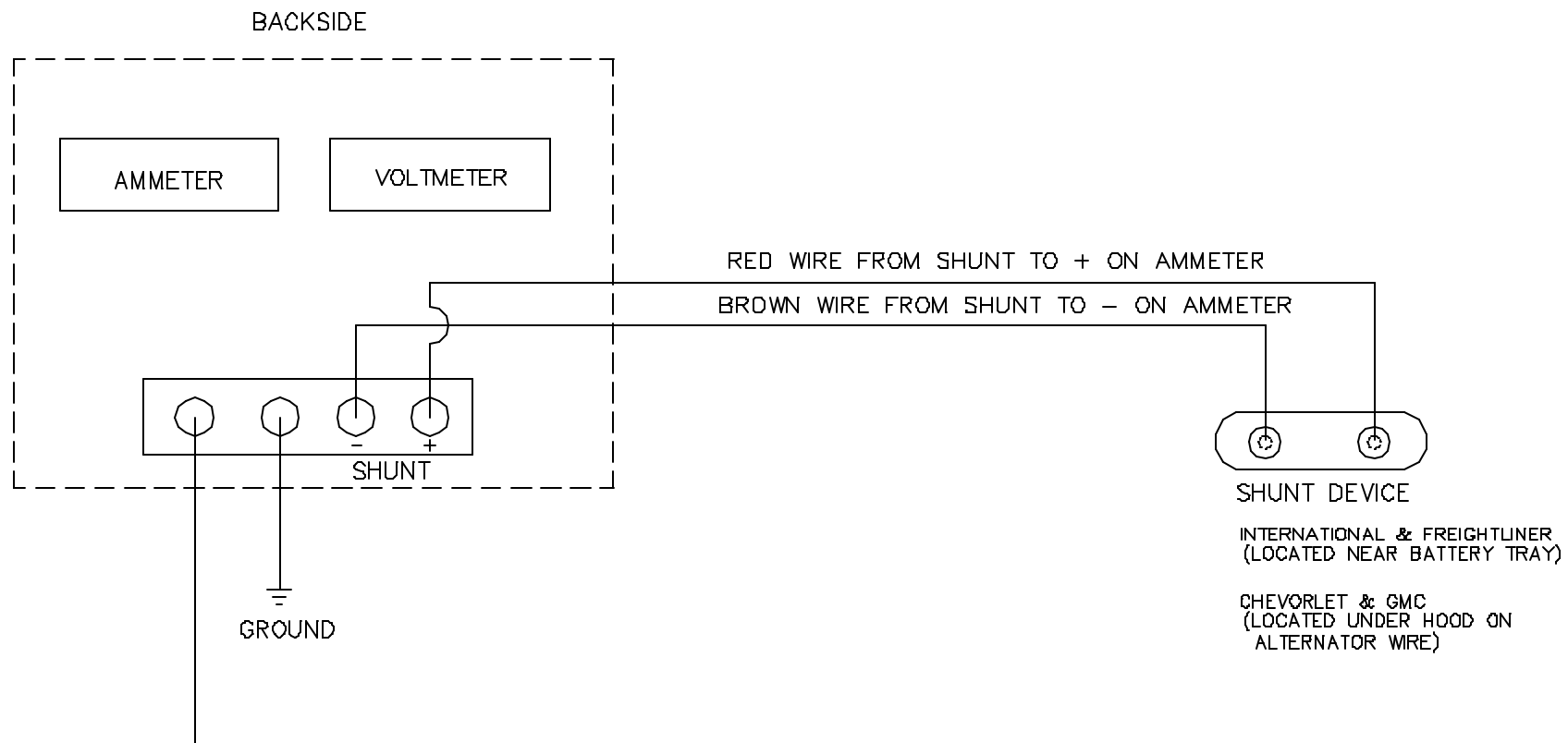
3-3



BACK OF HOURMETER

MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED
PART NAME: Back View of Hourmeter		
		DRAWING NUMBER: 3-3.DWG

3-4



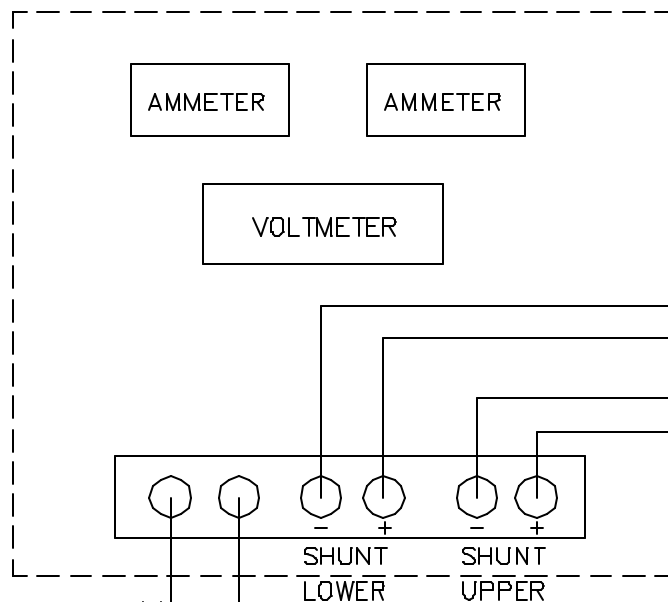
THROTTLE POWER FROM TERMINAL IGN "OUT"
TBS ON MAIN PC BOARD

MEDTEC
A PERKINS COMPANY

SCALE: None	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME: Ammeter & Voltmeter		
		DRAWING NUMBER:
		3-4.DWG

3-5

BACKSIDE



Installed around the
alternator wire

Shunt Sensor

No. 2

No. 1

Shunt Sensor

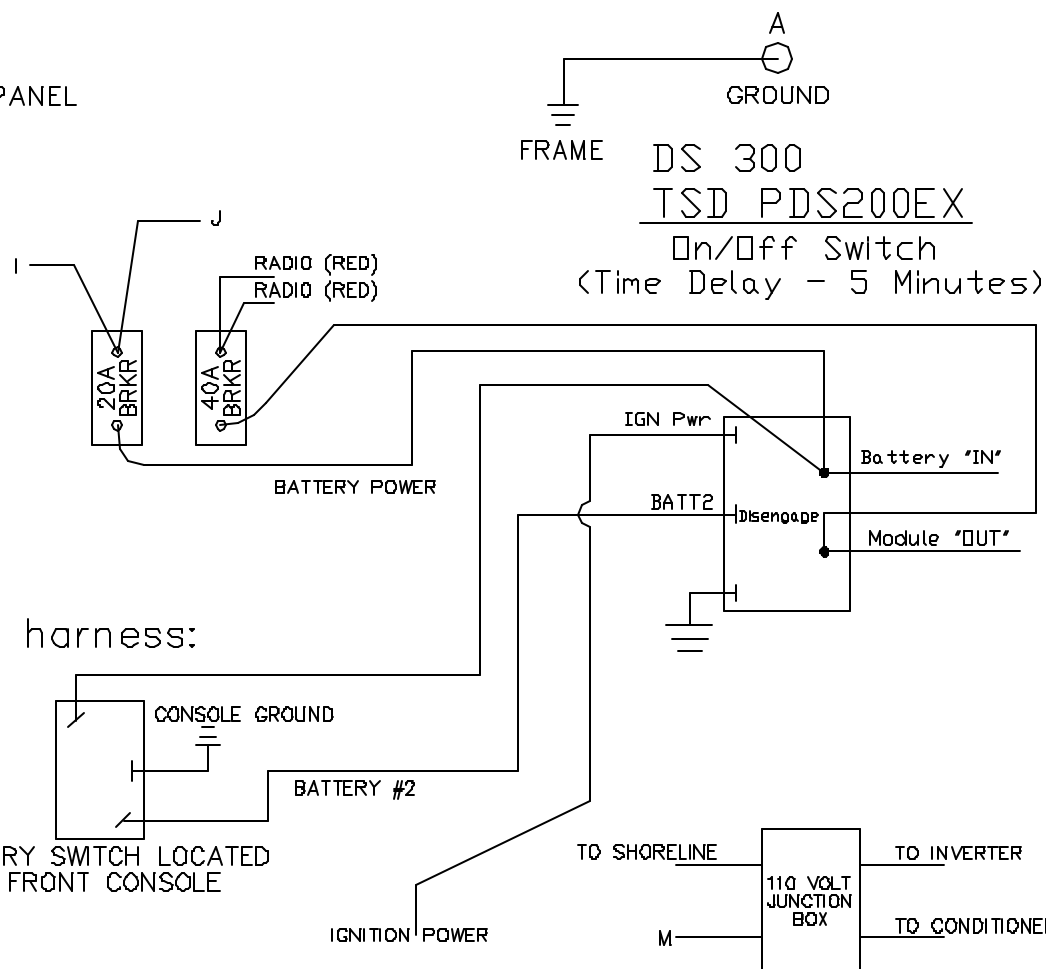
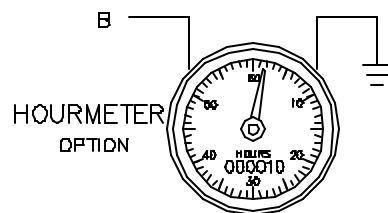
Installed around the
alternator wire

THROTTLE POWER FROM TERMINAL
IGN SOLENOID TB5 ON MAIN PC BOARD
(POWER COMES FROM THE IGNITION SOLENOID)

MEDTEC
A PERMCO COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME: Dual Ammeters & Voltmeter		
Ford Dual Alternators		DRAWING NUMBER: 3-5.IWG

NOTE: FIVE STRAND WIRE (L) TO REAR SWITCH PANEL
USED FOR PREWRING OF INVERTER

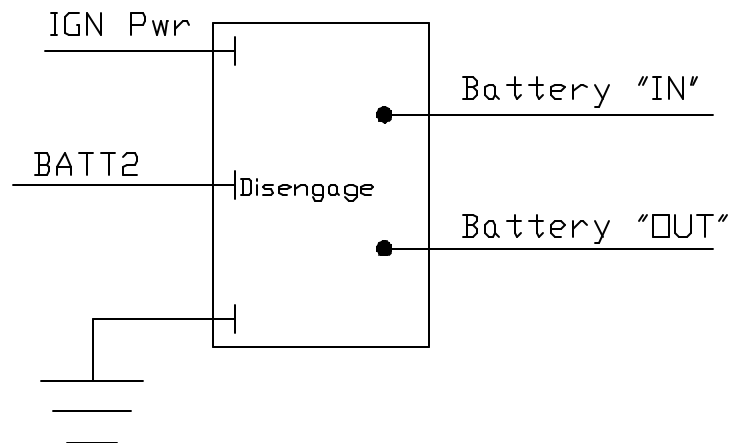


Wires from engine compartment harness:

- A. GROUND WIRES NOT SHOWN (WHT)
- B. HOURMETER (YEL)
- C. BATTERY 1 (YEL)-18 Ga.
- D. BATTERY 2 (YEL)
- E. START (TAN)-18 ga.
- F. CLOCK (ORG)
- G. MEDICAL 1 (GRE)
- H. FIVE STRAIN WIRE (SEE NOTE)
- I. 110 VOLT BLOCK HEATER (SJ CABLE)
- J. RED CABLE TO ELECTRIC PANEL-2 Ga.
- K. FLUORESCENT (RED) TO CONDITIONER

MEDTEC A PIERCE COMPANY		
SCALE: FIt	APPROVED BY: Herman Mullet	DRAWN BY: R/WB
DATE: 4/16/01		REVISED:
PART NAME: Rocker On/Off Battery Switch		
Under The Seatbase		DRAWING NUMBER: 3-6.DWG

DS300
TSD PDS200EX
On/Off Switch
(Time Delay - 5 Minutes)



MEDTEC
A PERIOD COMPANY

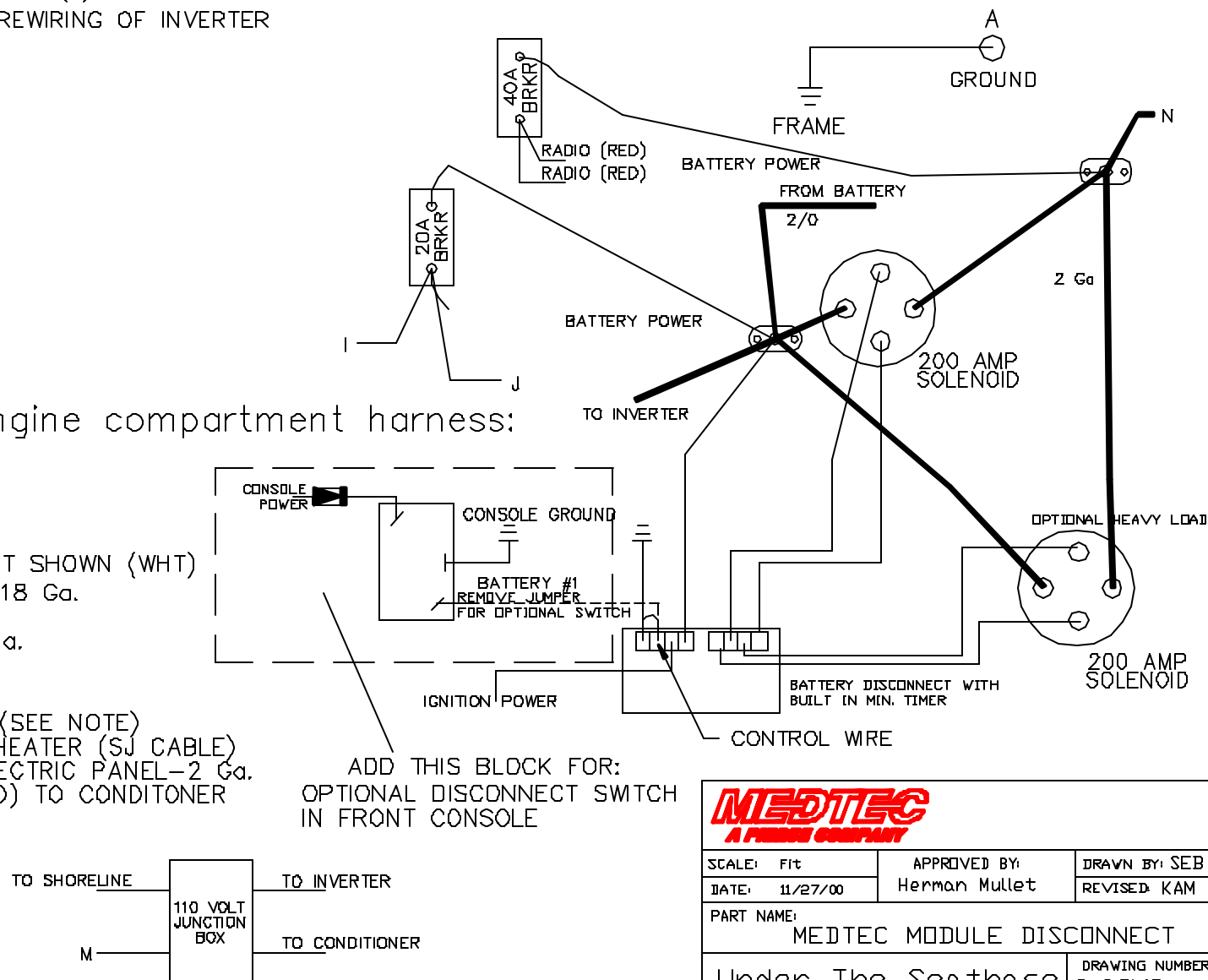
SCALE:	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME:	TSD Push Button On/Off Switch	
	DRAWING NUMBER: 3-7.DWG	

NOTE: FIVE STRAND WIRE (L) TO REAR SWITCH PANEL
USED FOR PREWIRING OF INVERTER

8-1-3

Wires from engine compartment harness:

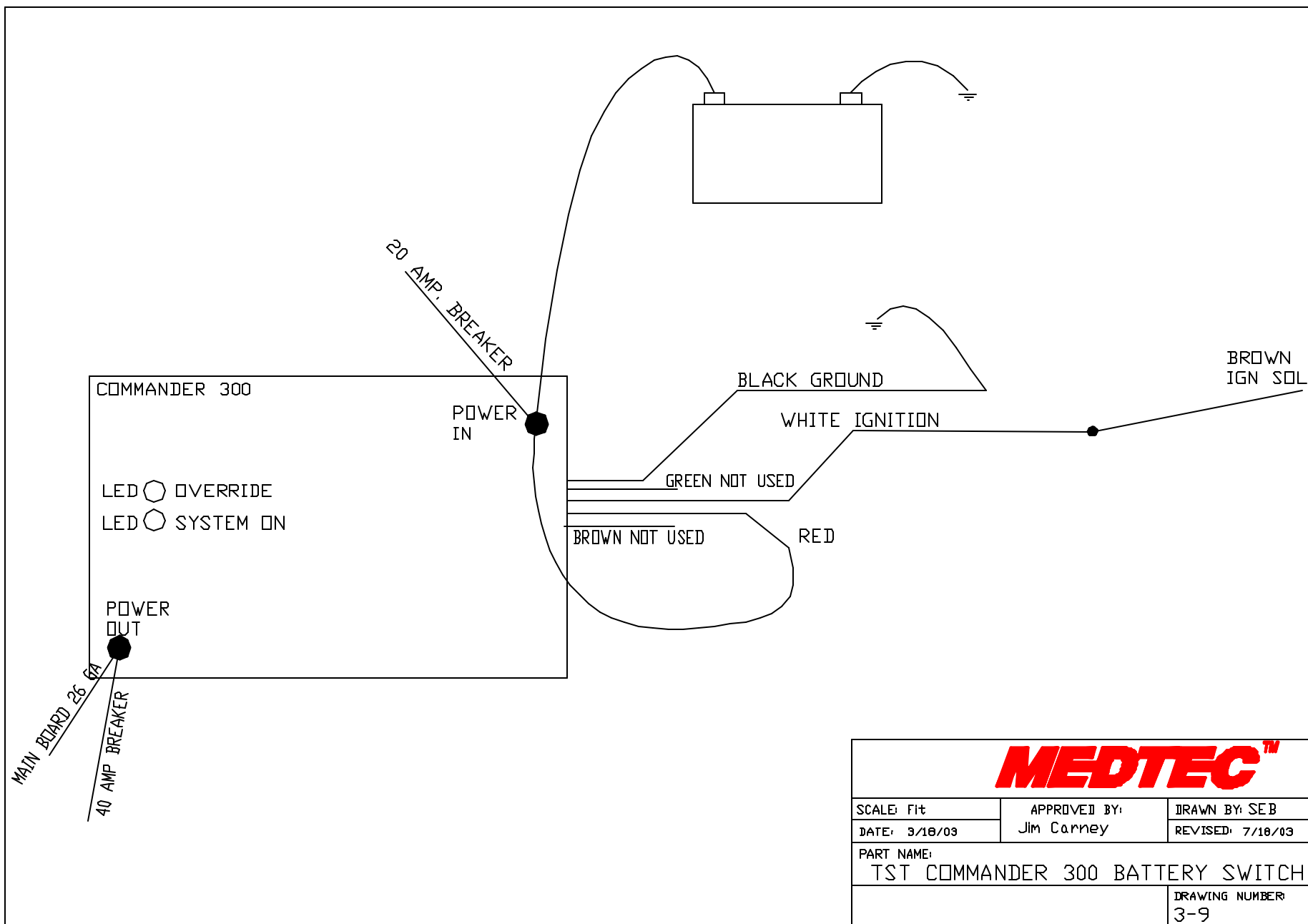
- A. GROUND WIRES NOT SHOWN (WHT)
- C. BATTERY 1 (YEL)-18 Ga.
- D. BATTERY 2 (YEL)
- E. START (TAN)-18 ga.
- I. CLOCK (ORG)
- J. MEDICAL 1 (GRE)
- L. FIVE STRAIN WIRE (SEE NOTE)
- M. 110 VOLT BLOCK HEATER (SJ CABLE)
- N. RED CABLE TO ELECTRIC PANEL-2 Ga.
- O. FLUORESCENT (RED) TO CONDITONER



MEDTEC
A FINEC COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 11/27/00		REVISED: KAM
PART NAME: MEDTEC MODULE DISCONNECT		
Under The Seatbase		DRAWING NUMBER: 3-8.DWG

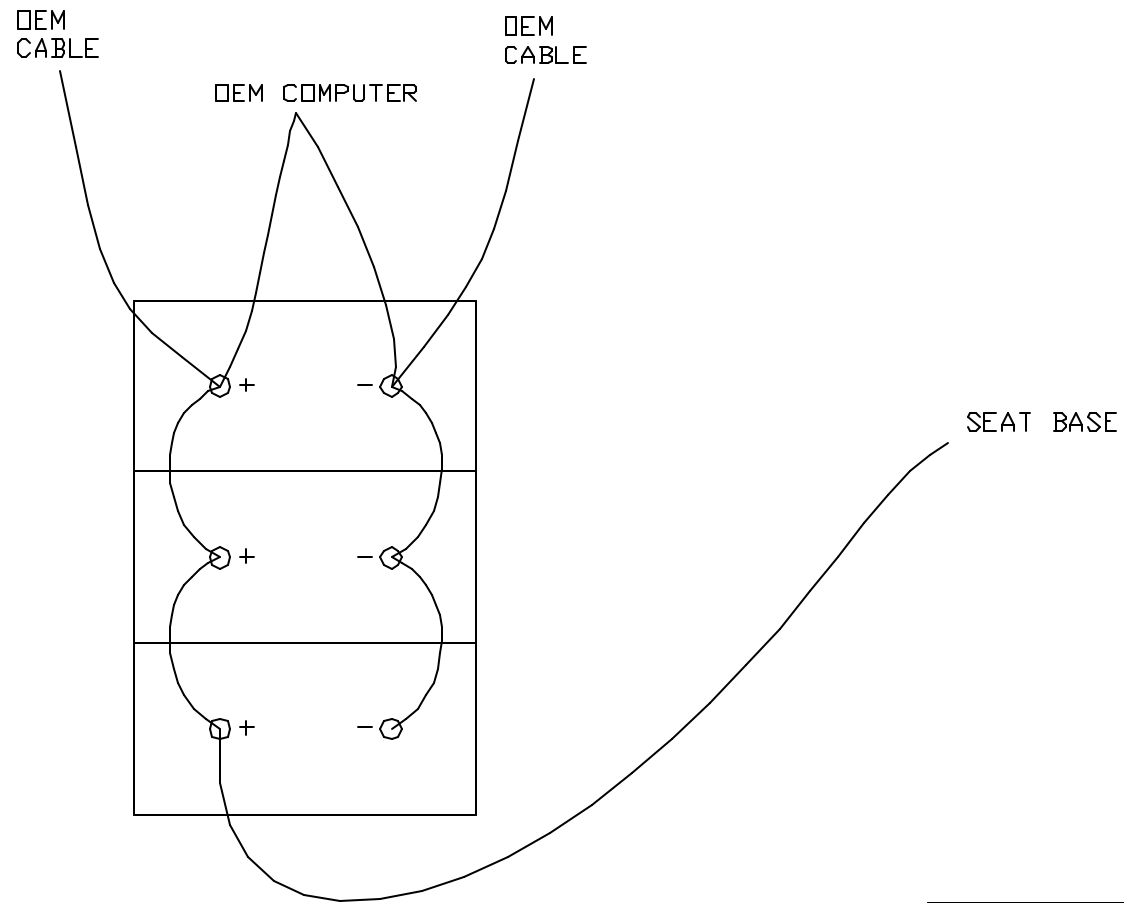
3-9



MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 3/18/03	Jim Carney	REVISED: 7/18/03
PART NAME:		
TST COMMANDER 300 BATTERY SWITCH		
		DRAWING NUMBER
		3-9

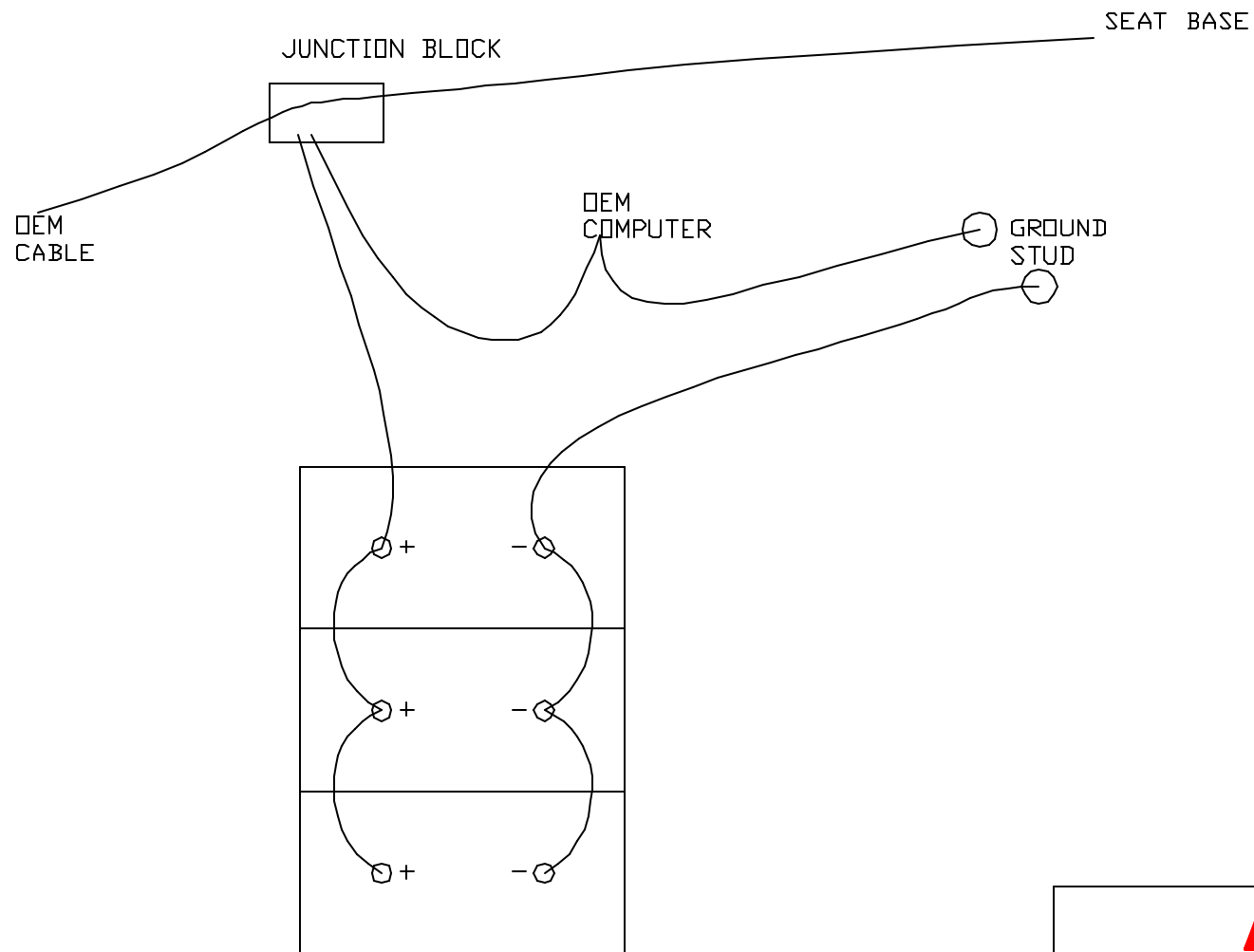
3-10



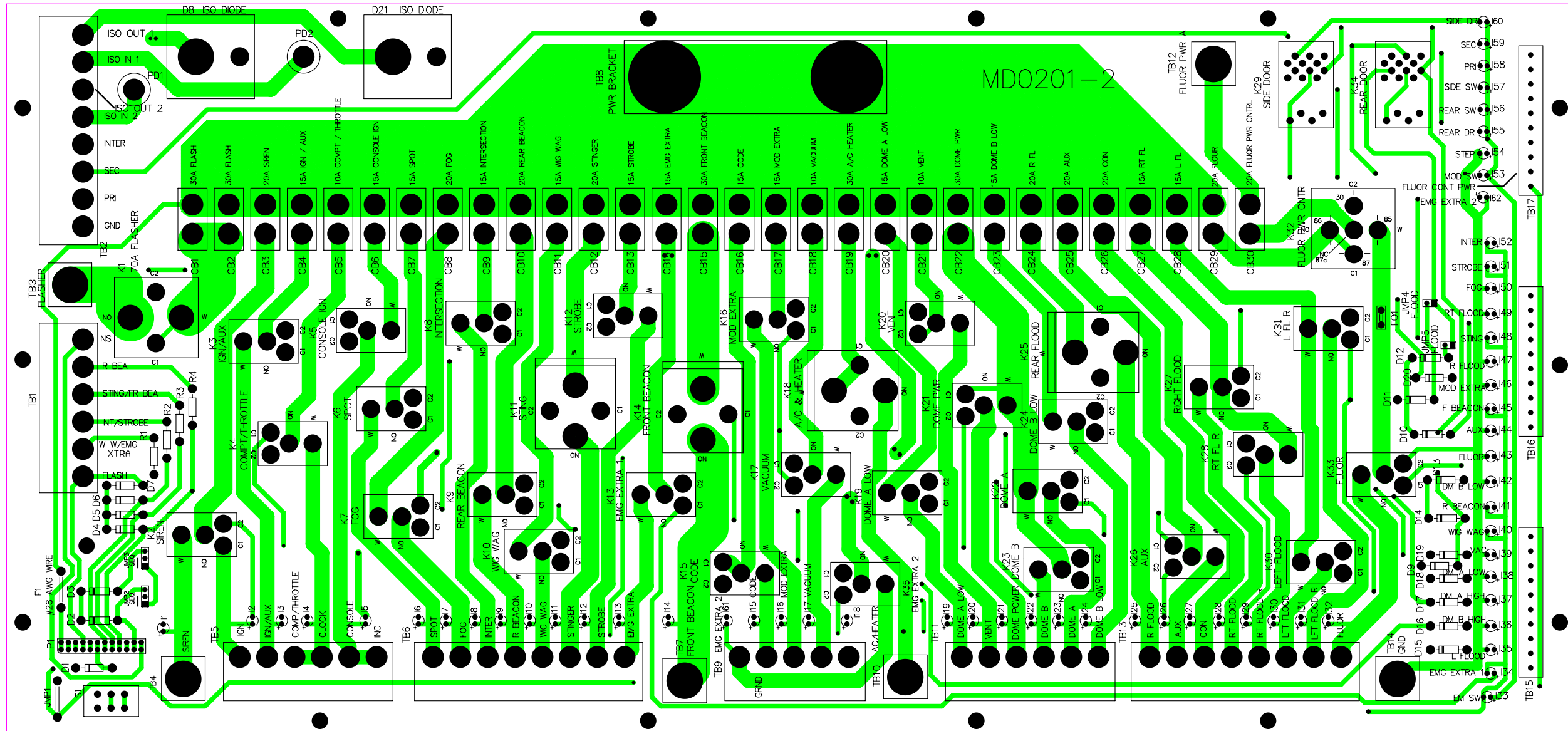
MEDTEC™

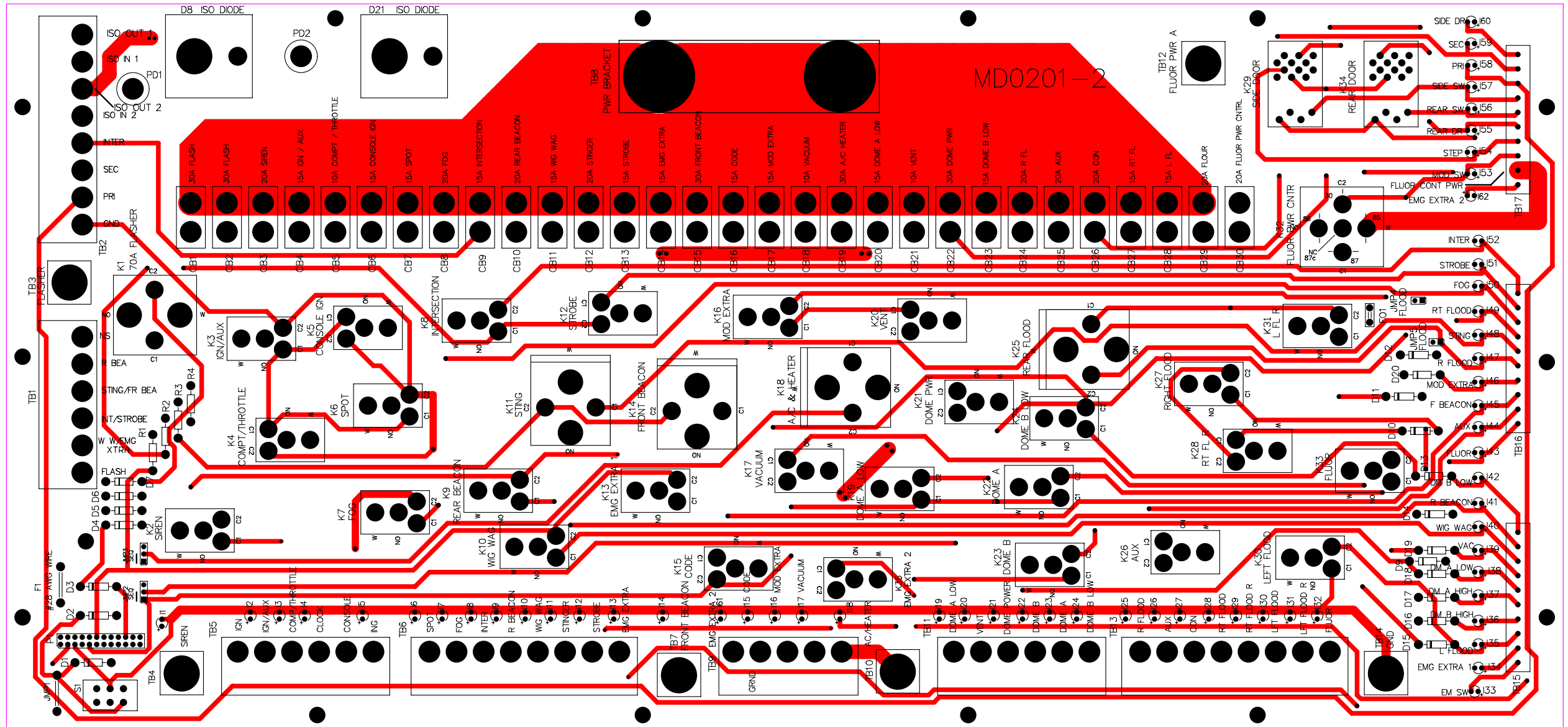
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/5/03		REVISED: ,
PART NAME: INTERNATIONAL FLIP DOWN STEP		
		DRAWING NUMBER 3-10

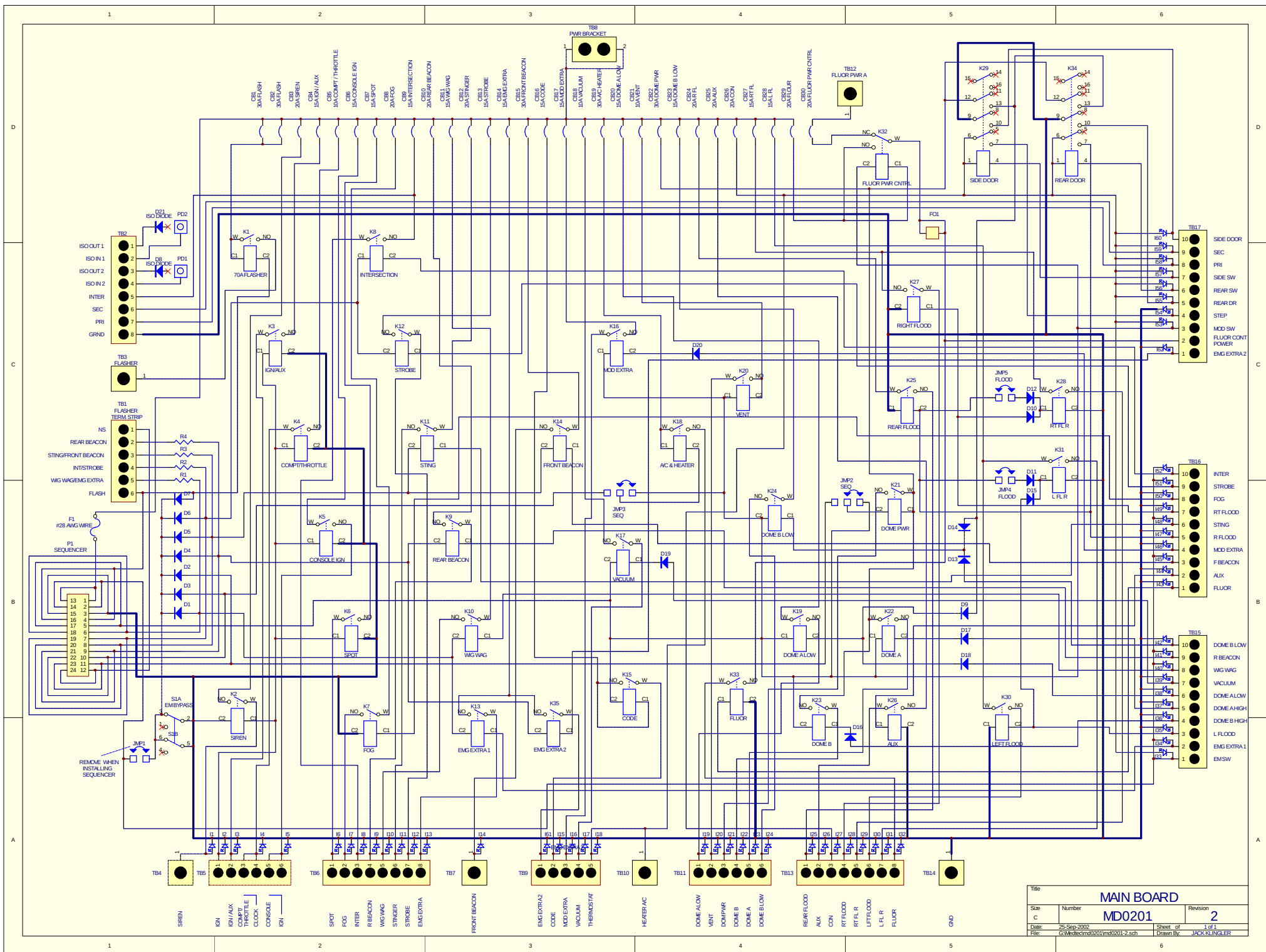
3-11



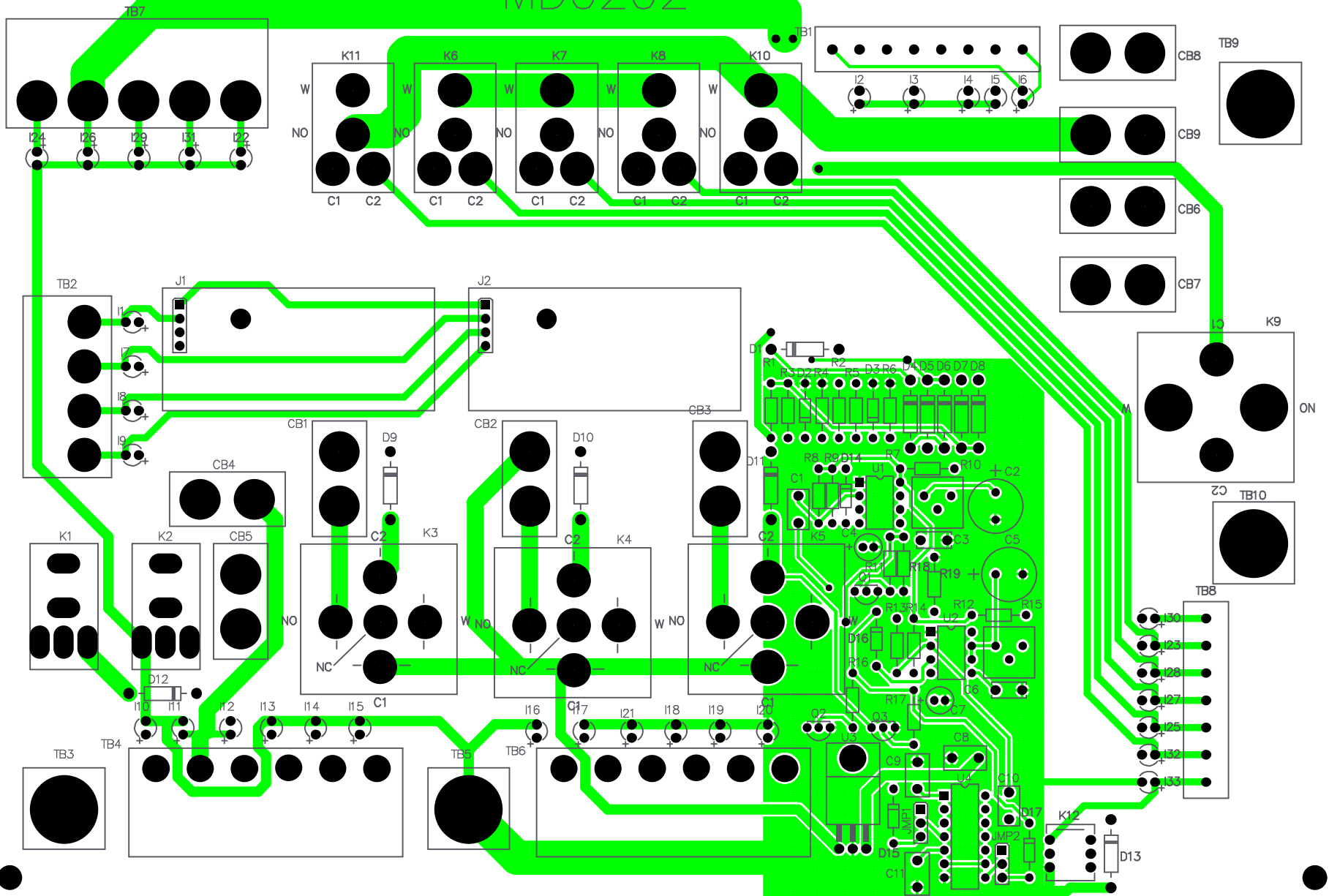
MEDTEC™		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/5/03		REVISED: ,
PART NAME: INTERNATIONAL SLIDE OUT TRAY		
		DRAWING NUMBER 3-11

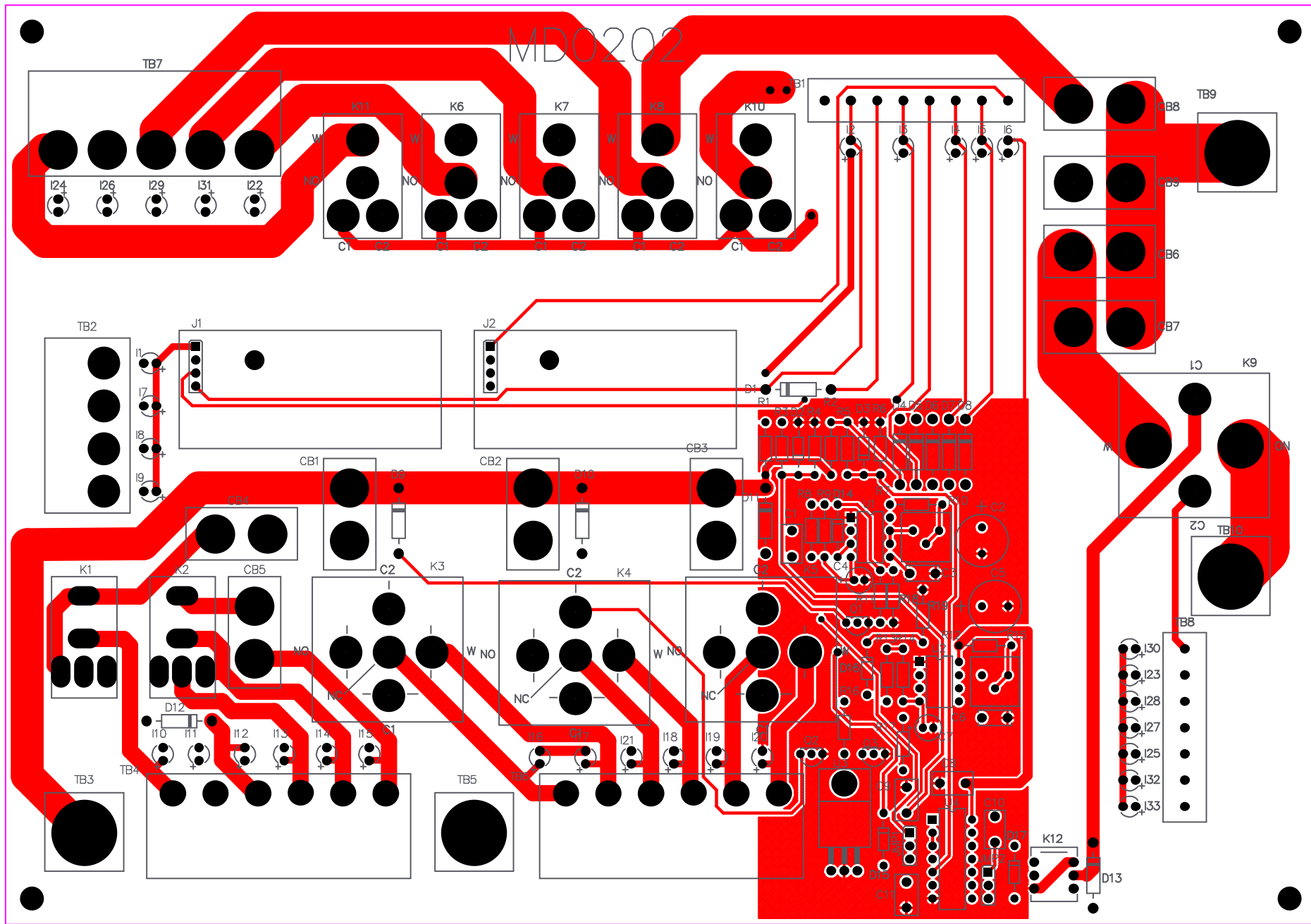


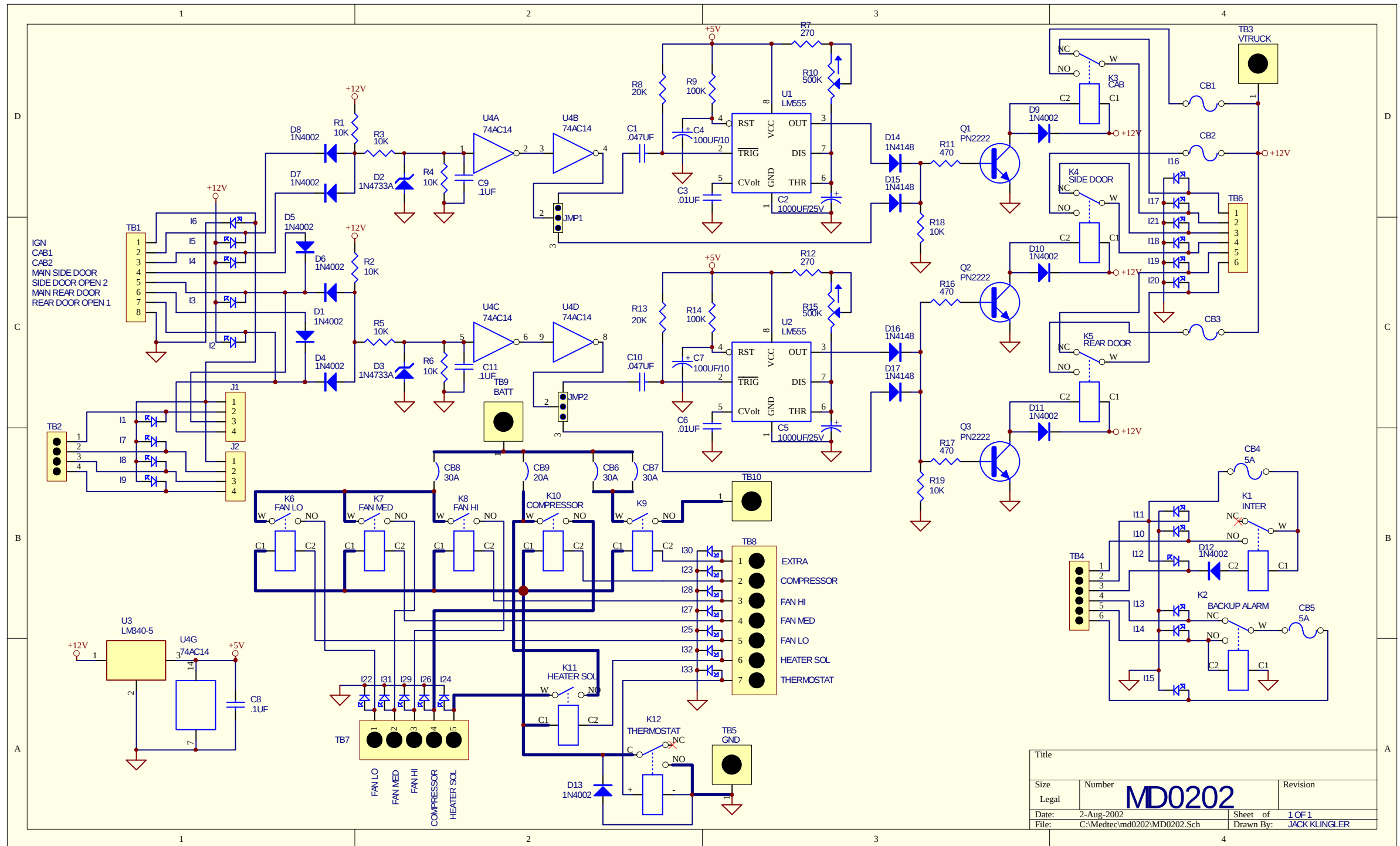




MDO202











Main PC Circuit Board (Self-Diagnostic) Layout

TB 1

1. NS: (Neutral Safety)
2. R BEA: Switch ground, rear beacon
3. STING/FR BEA: Switch ground, front beacon/stinger
4. INT/STROBE: Switch ground, strobe/intersectors
5. WW/EMG EXTRA: Switch ground, wig wag/ emergency extra
6. FLASH: Switch ground, flasher switch

TB 2

1. ISO OUT: MEDICAL 3
2. ISO OUT: MEDICAL 2
3. ISO IN : MEDICAL 1
4. INTR: (From Flasher)
5. SEC: (To Flasher)
6. PRI: (To Flasher)
7. GRND

TB3

1. **Flasher**
Power to emergency warning light flasher

TB4

1. **Siren**
12 ga. (red) - Power to siren

TB5

1. IGN: Ignition power (brown - 14 ga.) from OEM chassis, throttle power wire for front console amp and volt meters
2. ING/AUX:
3. COMP/THROTTLE: Compartment power (brown - 16 ga.) to all exterior compartment pc board
4. CLOCK: Clock ignition (blue - 14 ga.) to rear switch panel
5. THROT:
6. CONSOL: Console ignition (purple - 14 ga.) ignition controlled switch
7. IGN: Door open power

TB6

1. SPOT: Spot light (brown - 14 ga.) to behind seat base where spot light is located
2. FOG: Fog lights (brown - 14 ga.) to left and right fog lights on front bumper
3. INTER: Intersection (blue - 14 ga.) to either side fender under hood
4. R BECON: Rear beacon (green - 12 ga.) to power rear beacon
5. WIG WAG: Wig wag (blue - 14 ga.) to power wig wag flasher
6. STINGER: Stinger (purple - 14 ga.) to stingers in front beacon
7. STROBE: Strobe (yellow - 14 ga.) to power strobe pack
8. EXTRA (EMG): Emergency controlled

TB7

1. Front Beacon Terminal

- 10 ga. (blue) front beacon light to front beacon

TB9

1. GRND:
2. CODE: Code lights (red - 14 ga.) to code light power in rear panel
3. MOD EXTRA: Mod Disconnected controlled from EXTRA on TB2
4. VAC: Vacuum (orange - 14 ga.) to vacuum pump
5. A/C: Thermostat power (brown - 14 ga.) to rear panel

TB10

1. Heater Terminal

- 10 gauge (red) A/C wire to rear heater

TB11

1. DOME A LOW: Dome low (yellow - 14 ga.) to dome lights
2. VENT: Vent (yellow - 14 ga.) to rotary vent switch in rear panel
3. DOME POWER: Dome power (orange - 14 ga.) to dome switch in rear panel
4. DOME B: Dome high B (red - 14 ga.) to curbside dome lights
5. DOME A: Dome high A (orange - 14 ga.) to streetside dome lights
6. DOME B LOW: Dome low (gray - 14 ga.) to dome lights

TB12

1. FLUOR PWR A

TB13

1. R FLOOD: Rear flood (green - 14 ga.) to rear flood
2. AUX: Used for auxiliary power
3. CON: Console power (red - 14 ga.) to front switch console
4. RT FLOOD: Right flood (purple - 14 ga.) to right flood front side
5. RT FLOOD R: Right flood (purple - 14 ga.) to right flood rear side
6. LEFT FLOOD: Left flood (gray - 14 ga.) to left flood front side
7. LEFT FLOOD R: Left flood (gray - 14 ga.) to left flood rear side
8. FLUOR: Fluorescent light

TB14

1. Ground Terminal

Bottom left side of PC board

14 gauge (white) ground wire runs to chassis, ground at driver's seat base

TB15

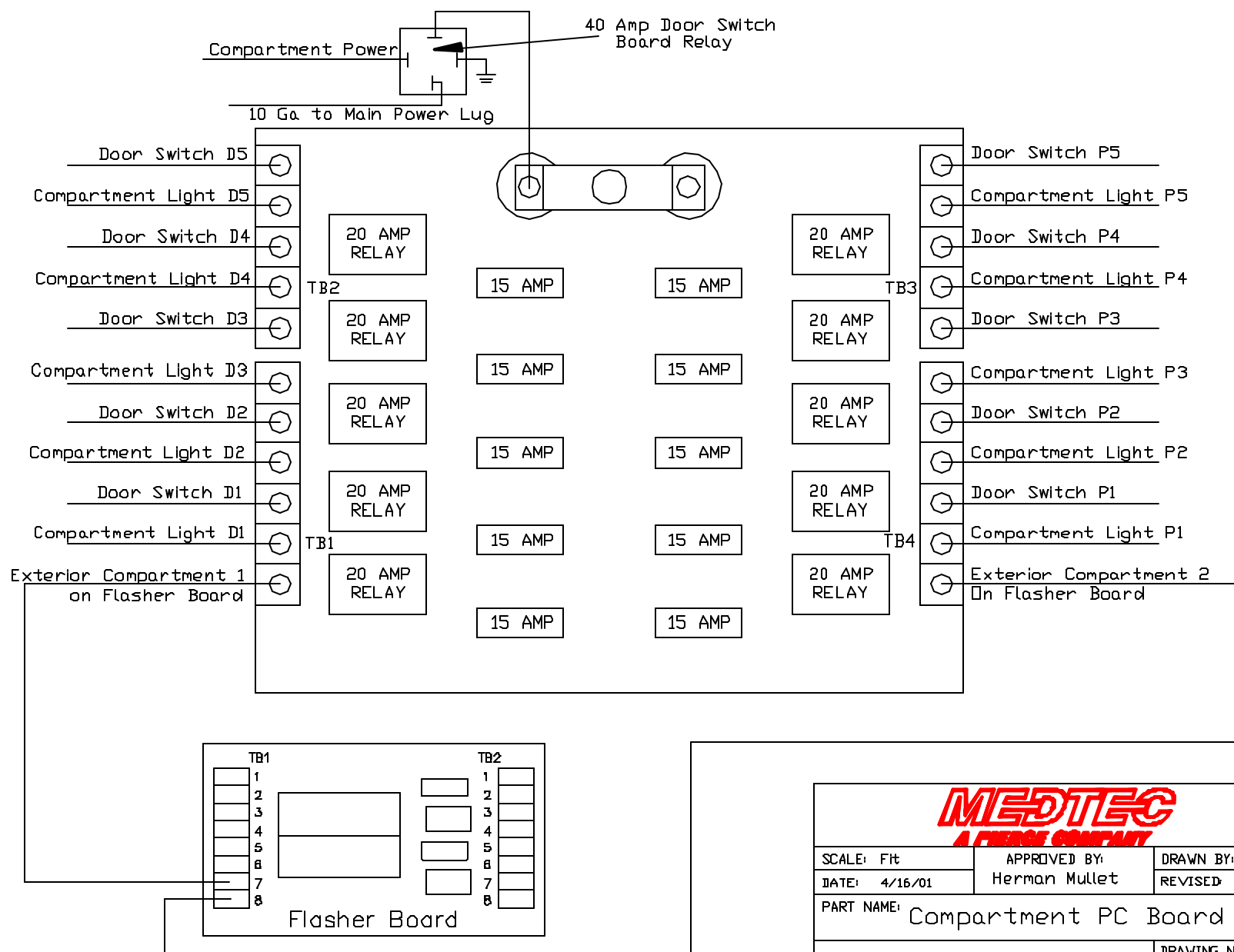
1. DM B LOW: Dome B, yellow runs to rear panel dome switch (Dome Harness)
2. R BEC: Rear beacon (blue/white) to rear beacon switch on console
3. WIG WAG: Wig Wag (green/black) to wig wag switch on console
4. VAC: Vacuum pump (tan) to rear panel suction switch (Dome Harness)
5. DM A LOW: Dome A, white runs to rear panel dome switch (Dome Harness)
6. DM A HIGH: Dome A, red runs to rear panel dome switch (Dome Harness)
7. DM B HIGH: Dome B, black runs to rear panel dome switch (Dome Harness)
8. L FLOOD: Left flood control, red wire from left flood switch on console
9. EMG EXTRA: Extra terminal, controls D1 on left side of PC-TB71 Emergency Control
10. EM SW: Master emergency (green/white) from master switch on console

TB16

1. INTER: Intersection (white/black) to front switch panel
2. STROBE: Strobe (red/black) to strobe switch on console
3. FOG: Fog (blue) to fog light switch on console
4. RT FLOOD: Right flood (orange) to right flood switch on console
5. STING: Stinger (blue/black) to stringer switch on console
6. R FLOOD: Rear flood (green) to rear flood switch on console
7. MOD EXTRA:
8. F BEACON: Front Beacon (black) to front beacon switch on console
9. AUX:
10. FLUOR: Fluorescent (orange) to rear switch panel fluorescent light switch

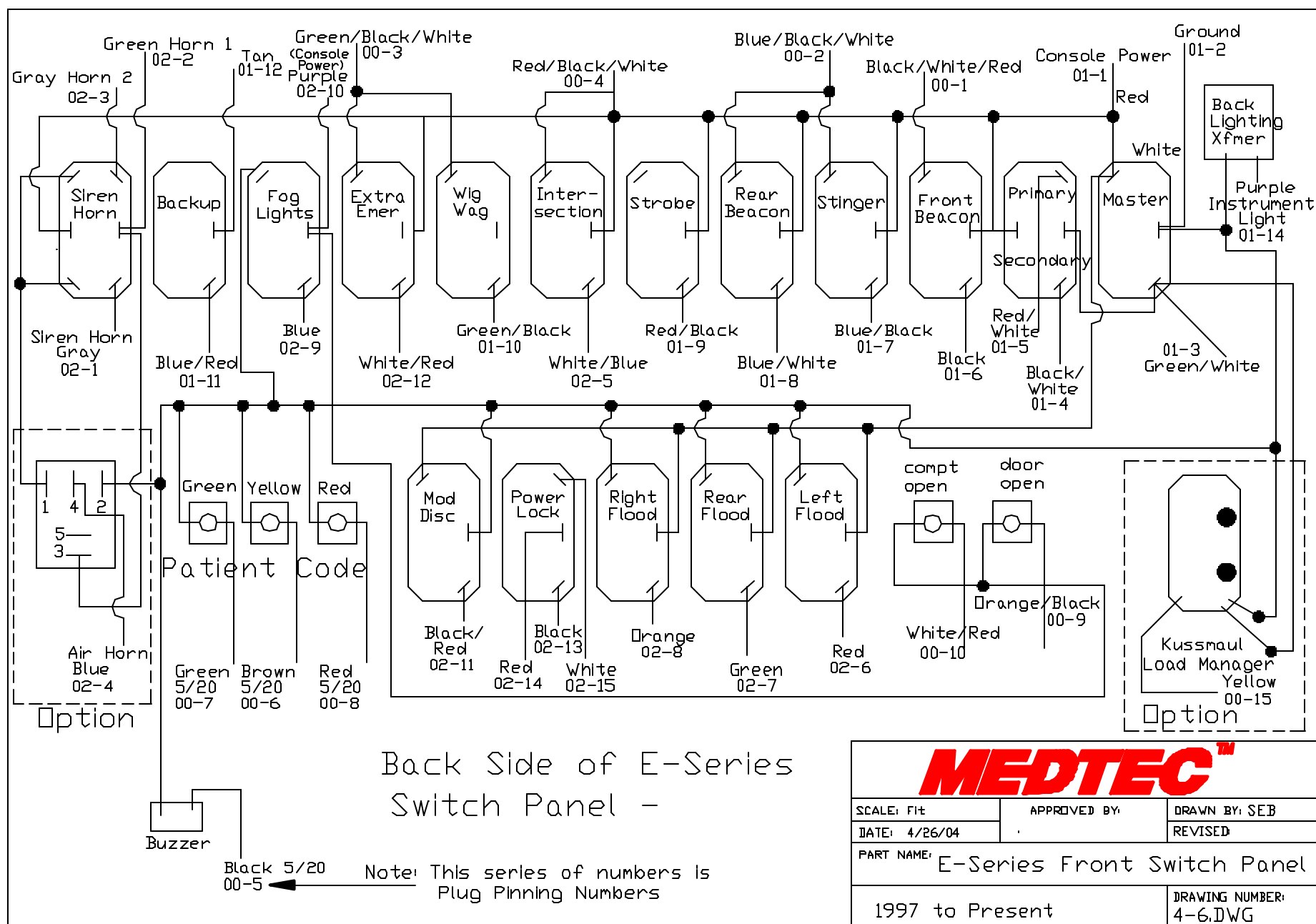
TB17

1. SIDE DR: To front switch panel (red/green)& To flasher board (Door Open #2)
2. SEC: Secondary (red/white) to primary/secondary switch on console
3. PRI: Primary (black/white) to primary/secondary switch on console
4. SIDE SW: From side door switch (Door Open #2)
5. REAR SW: From rear door switch (Door Open #1)
6. REAR DR: To front switch panel (orange/red) & To flasher board (Door Open #1)
7. STEP: Stepwell light (red) to stepwell light
8. MOD SW: Module disconnect (black/red) to mod disconnect switch on console
9. FLUOR CONT PWR: To fluorescent light switch in rear console (Fluor #1)



MEDTEC A FERRIS COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME: Compartment PC Board		
98-OLDER		DRAWING NUMBER: 4-5.DWG

4-6

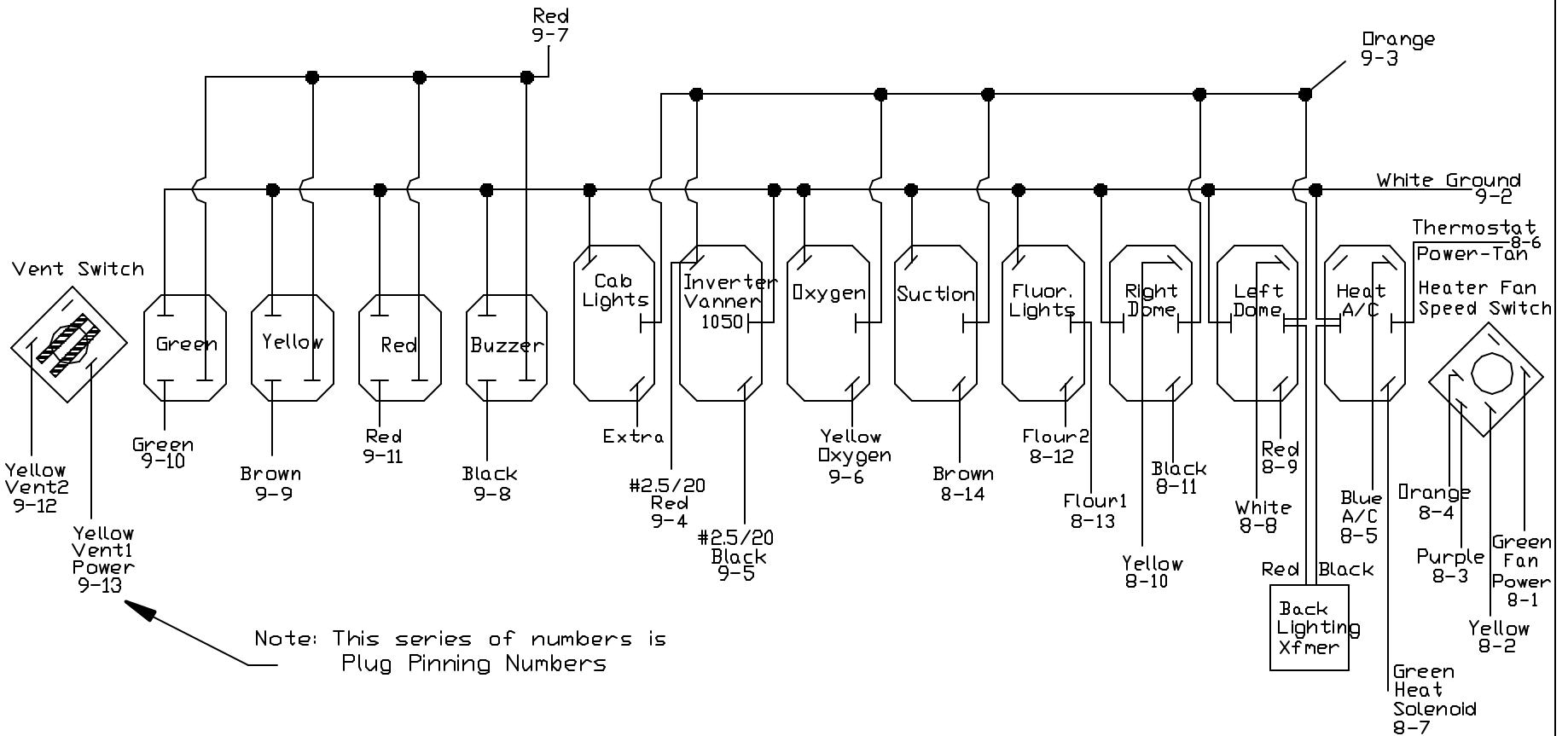


Back Side of E-Series
Switch Panel -

MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/26/04		REVISED
PART NAME: E-Series Front Switch Panel		
1997 to Present		DRAWING NUMBER: 4-6.DWG

4-7



Back Side of Rear Switch Panel

MEDTEC™		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/26/04	Herman Mullet	REVISED:
PART NAME: Rear Switch Panel		
		DRAWING NUMBER: 4-7.DWG

Connector/Housing Description

Rear Switch Panel

Panel #8

Check
One ☒(Pin)
Male(Pin)
Female

Pin Number	Wire Color	Awg.	Function Description
①	Green	14	Fan Power
②	Yellow	14	Fan "Low"
③	Purple	14	Fan "Medium"
④	Orange	14	Fan "High"
⑤	Blue	14	A/C Power
⑥	Tan	16	Thermostat Power
⑦	Green	18	Heat Solenoid
⑧	White	20	8/20 Dome Left "Low"
⑨	Red	20	8/20 Dome Left "High"
⑩	Yellow	20	8/20 Dome Right "Low"
⑪	Black	20	8/20 Dome Right "High"
⑫	Orange	20	8/20 Fluorescent #2
⑬	Purple	14	Fluorescent Power
⑭	Brown	20	8/20 Vacuum Pump
⑮			

MEDTEC

SCALE: Fit

DATE: 3/26/03

APPROVED BY:

Herman Mullet

DRAWN BY: SEB

REVISED:

PART NAME:

Rear Switch Panel #8

Self-Diagnostic

DRAWING NUMBER:

4-8-1.DWG

Connector/Housing Description

Rear Switch Panel

Panel #9

Check
One ☒<Pin>
Male<Pin>
Female

Pin Number	Wire Color	Awg.	Function Description
①			
②	White	14	Ground 3 PCP
③	Orange	14	Dome Power
④	Red	20	#2 5/20 Inverter
⑤	Black	20	#2 5/20 Inverter
⑥	Yellow	16	Oxygen
⑦	Red	18	Patient Code
⑧	Black	5/20	#1 5/20 Code Buzzer
⑨	Brown	5/20	#1 5/20 Code Light
⑩	Green	5/20	#1 5/20 Code Light
⑪	Red	5/20	#1 5/20 Code Light
⑫	Yellow	14	Vent #2
⑬	Yellow	14	Vent #1 Power
⑭			Open
⑮			Open

MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 3/26/03	Herman Mullet	REVISED:
PART NAME: Rear Switch Panel		
Panel #9		DRAWING NUMBER: 4-8-2.DWG

4-8-3

Connector/Housing Description

97 Front Switch Panel Plugs

Plug 00

Check
One ☒(Pin)
Male(Pin)
Female

Pin Number	Wire Color	Awg.	Function Description
①	Black/ White/ Red	30/22	Front Beacon Ground-Stinger
②	Blue/ Black/ White	30/22	Stinger & Rear Beacon Ground
③	Green/ Black/ White	30/22	Wig Wag & Extra Ground
④	Red/ Black/ White	30/22	Stroke & Intersection Ground
⑤	Black	5/20	Buzzer 12V "+"
⑥	Brown	5/20	Amber Code Light
⑦	Green	5/20	Green Code Light
⑧	Red	5/20	Red Code Light
⑨	Orange/ Black	18	Door Open Flasher
⑩	White/ Red	18	Compartment Open Flasher (Yellow)
⑪	Orange/ Red	18	Door Open #1 - Rear
⑫	Red/ Green	18	Door Open #2 - Side
⑬	Red	18	Compartment Open #1 - Left
⑭	Red	18	Compartment Open #2 - Right
⑮	Wht/ Black/ Red	30/20	Pri/Sec Sequencer

Note: IF Door Panel Indicator Panel
Wiring Harness Indicator

#11	Green Wire
#12	White Wire
#13	Red Wire
#14	Yellow Wire

MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 3/26/03	Herman Mullet	REVISED
PART NAME: 97 Front Switch Panel Plugs		
Plug 00		DRAWING NUMBER: 4-8-3.DWG

Connector/Housing Description

97 Front Switch Panel Plugs

Plug 01

Check
One ☒ (Pin)
Male ☐ (Pin)
Female

Pin Number	Wire Color	Awg.	Function Description
①	Red	14	Console Power
②	White	14	Console Ground
③	Green/ White	30/22	Master Emergency
④	Black/ White	30/22	Primary
⑤	Red/ White	30/22	Secondary
⑥	Black	30/22	Front Beacon
⑦	Blue/ Black	30/22	Stinger
⑧	Blue/ White	30/22	Rear Beacon
⑨	Red/ Black	30/22	Stroke
⑩	Green/ Black	30/22	Wig Wag
⑪	Blue/ Red	30/22	Back-up Alarm Control
⑫	Tan	16	Back-up Alarm
⑬	Orange	18	(Throttle) N/S
⑭	Purple	18	Instrument Light
⑮	White	30/22	

MEDTEC™

SCALE: FIT	APPROVED BY:	DRAWN BY: SEB
DATE: 3/26/03	Herman Mullet	REVISED:
PART NAME: 97 Front Switch Panel Plugs		
Plug 01		DRAWING NUMBER: 4-8-4.DWG

4-8-5

Connector/Housing Description

97 Front Switch Panel Plugs

Plug 02

Check
One ☒(Pin)
Male(Pin)
Female

Pin Number	Wire Color	Awg.	Function Description
①	Gray	16	Horn/Siren
②	Green	14	Horn #1 - Power
③	Gray	14	Horn #2 - OEM Horn
④	Blue	14	Airhorn
⑤	White/ Black	30/22	Intersection
⑥	Red	30/22	Left Flood
⑦	Green	30/22	Rear Flood
⑧	Orange	30/22	Right Flood
⑨	Blue	30/22	Fog Light
⑩	Purple	14	Console Ignition
⑪	Black/ Red	30/22	Module Disconnect
⑫			
⑬	Black	18/3	Power Lock
⑭	Red	18/3	Power Lock
⑮	White	18/3	Power Lock

MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 3/26/03	Herman Mullet	REVISED:
PART NAME: 97 Front Switch Panel Plugs		
Plug 02		DRAWING NUMBER: 4-8-5.DWG

4-8-6

Connector/Housing Description

97 Front Switch Panel Plugs

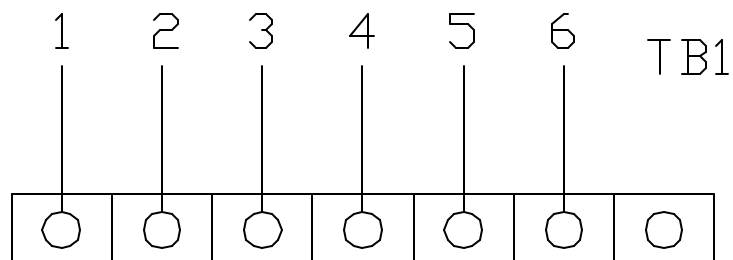
Plug 03

Check
One ☒ ☒ (Pin)
Male ☐ (Pin)
Female (Top)

Pin Number	Wire Color	Awg.	Function Description
①	White	18	Ground
②			
③			
④			
⑤			
⑥	Tan	18	Ignition - Throttle Power
⑦	Orange	12	Arrow Stick Power
⑧	White	12	Ground - Aux 12 gage
⑨	Yellow	16	Speaker '+' (2)
⑩	Yellow	16	Speaker '-' (2)
⑪	Red	12	Siren Power
⑫	White	12	Siren Ground
⑬	Red	16	Speaker '+' (1)
⑭	Red	16	Speaker '-' (1)
⑮	Gray	16	Siren Horn

MEDTEC

SCALE: Ft	APPROVED BY:	DRAWN BY: SEB
DATE: 3/26/03	Herman Mullet	REVISED:
PART NAME: 97 Front Switch Panel Plugs		
Plug 03		DRAWING NUMBER 4-8-6.DWG



Electrical
Panel
Board

Brown--1. Flasher Grnd = White/Black/Red
 Green--2. Wig/Wag & Extra = Green/Black/White
 Red---3. Strobe & Intersection = REd/Black/White
 Black--4. Front Beacon = Black/White/Red
 White--5. Rear Beacon = Blue/Black/White
 Orange N/S--6. N/S

MEDTEC A PIERCE COMPANY		
SCALE:	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME: Grounds for Front Console Emergency Switches		
Models: As Required 98-Older	DRAWING NUMBER 4-9.DWG	



Operation Guidelines for Self-Diagnostic PC Board

Notes: Green lights indicate power into the board

Red lights indicate power out of the board

<u>Light Number</u>	<u>Equipment</u>	<u>Light Number</u>	<u>Equipment</u>
I1	SIREN	I31	LFT FLOOD R
I2	IGN	I32	FLUOR
I3	IGN AUX	I33	EM SW
I4	COMP/THROTTLE/CLOCK	I34	EMG EXTRA
I5	CONSOLE IGN	I35	L FLOOD
I6	SPOT	I36	DM B HIGH
I7	FOG	I37	DM A HIGH
I8	INTER	I38	DM A LOW
I9	R BEACON	I39	VAC
I10	STINGER	I40	WIG WAG
I11	WIG WAG	I41	R BEACON
I12	STROBE	I42	DM B LOW
I13	EMG EXTRA	I43	FLUOR
I14	FRONT BEACON	I44	AUX
I15	CODE	I45	F BEACON
I16	MOD EXTRA	I46	MOD EXTRA
I17	VACUUM	I47	R FLOOD
I18	AC/HEATER	I48	STING
	TB10	I49	RT FLOOD
I19	DOMA A LOW	I50	FOG
I20	VENT	I51	STROBE
I21	DOMA POWER	I52	INTER
I22	DOMA B	I53	MOD SW
I23	DOMA A	I54	STEP
I24	DOMA B LOW	I55	REAR DR
I25	R FLOOD	I56	REAR SW
I26	AUX	I57	SIDE SW
I27	CON	I58	PRI
I28	RT FLOOD	I59	SEC
I29	RT FLOOD R	I60	SIDE DR
I30	LFT FLOOD		

Trouble Shooting Guidelines

1. If the green light entering the circuit board is **NOT** lite, then there is loss of continuity upstream of the circuit board.
2. If the green light entering the circuit board is lite, there is power to the circuit board.
3. If the green light entering the circuit board is lite but the red light leaving the circuit board is **NOT** lite, then there is a problem with the fuse, relay or internal copper leads in the circuit board.
4. If the green light entering the circuit board is lite and the red light leaving the pc board is lite, then the problem is downstream of the circuit board.

Medtec Sequencer and Load Manager

A sequencer and load manager has been designed in the Medtec's new main self-diagnostic electrical PC board. Electrical loads are sequenced and shed as a pair. This sequencer/load manager is programmable and allows for the control of seven circuits. Medtec will provide the following standard program shedding order of the sequencer/load manager. Loads will be re-energized in the reverse order.

First:	Wig Wag System
Second:	Rear Beacon
Third:	Intersection and Strobe Lights
Fourth:	Front Beacon and Stinger
Fifth:	Rear Heat/Cool System
Sixth:	Module Dome Lights
Seventh:	Module Body Flashers

This new system begins shedding electrical circuits at 12 VDC and all seven circuits are shed at 10.5 VDC. The shedding is controlled by a step decrease/increase in VDC. Each step is about .2 VDC. This means that each increment of .2 VDC will shed or re-energize the predetermined load. If you do not have all the above loads, the first load to shed or last load to re-energize will be selected according to the ranking in the above listing at the designated .2 VDC step.



Medtec Sequencer & Load Manager Programming Instructions

Medtec's Standard Settings

ON/OFF

Dip Switch	1	2	3	4	5
S1	OFF	OFF	OFF	OFF	ON
S2	ON	OFF	OFF	OFF	OFF
S3	OFF	ON	OFF	OFF	OFF
S4	OFF	OFF	OFF	ON	OFF
S5	OFF	OFF	ON	OFF	OFF
S6-1	ON	OFF			
S6-2	ON	OFF			

Load Switches

Sequence Switch

- S1: Flasher Circuit
- S2: Wig Wag and Extra Emergency Circuits
- S3: Intersection and Strobe Circuits
- S4: Front Beacon and Stinger Circuits
- S5: Rear Beacon Circuit
- S6-1: Rear Heat/Cool Circuit
- S6-2: Dome Lights Circuit

Shedding Sequence Dip Switch

First	1
Second	2
Third	3
Fourth	4
Fifth	6-2
Sixth	6-1
Seventh	5

Note: Loads are re-energized in reverse order.
The new electrical board allows for load shedding when the vehicle is in motion.

JMP1: If no Medtec sequencer/load manager, you must jump so as to provide master emergency control on the front console.

JMP2: Dome Lights: Jump center & left pins: work with mod disconnect only
SEQ Jump center & right pins: work with load manager/sequencer

JMP3: Heat/Cool: Jump center & left pins: work with mod disconnect only
SEQ Jump center & right pins: work with load manager/sequencer

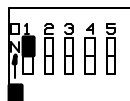
JMP4: Flood Lights: Jump center & left pins: Activate light w/reverse + rear doors
SEQ Jump center & right pins: work with load manager/sequencer

JMP5: Flood Lights: Jump center & left pins: Activate rear light w/reverse + rear doors
SEQ Jump center & right pins: work with load manager/sequencer

Medtec's Standard Sequencer and Load Manager Settings



S1



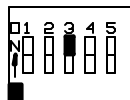
S2



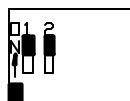
S3



S4



S5



S6

Sequence On

First: Flasher Circuit
 Second: Dome Lights Circuit
 Third: Rear Heat/Cool Circuit
 Fourth: Front Beacon & Stinger Circuits
 Fifth: Intersection & Strobe Circuits
 Sixth: Rear Beacon Circuit
 Seventh: Wig Wag & Extra Emergency Circuits

Note: This Electrical Board allows
 for Load Shedding when the
 vehicle is in motion.

S1: Flasher Circuit
 S2: Wig Wag & Extra Emergency Circuits
 S3: Intersection & Strobe Circuits
 S4: Front Beacon & Stinger Circuits
 S5: Rear Beacon Circuit
 S6-1: Rear Heat/Cool Circuit
 S6-2: Dome Lights Circuit

JMP1: If no Medtec sequencer/load manager, you must jump so as
 to provide mater emergency control on the front console.

JMP2: Dome Lights Jumpers

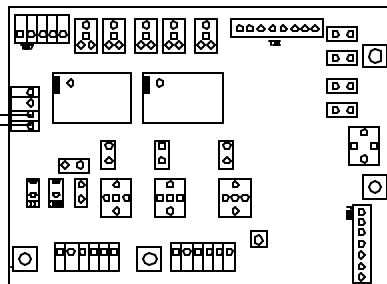
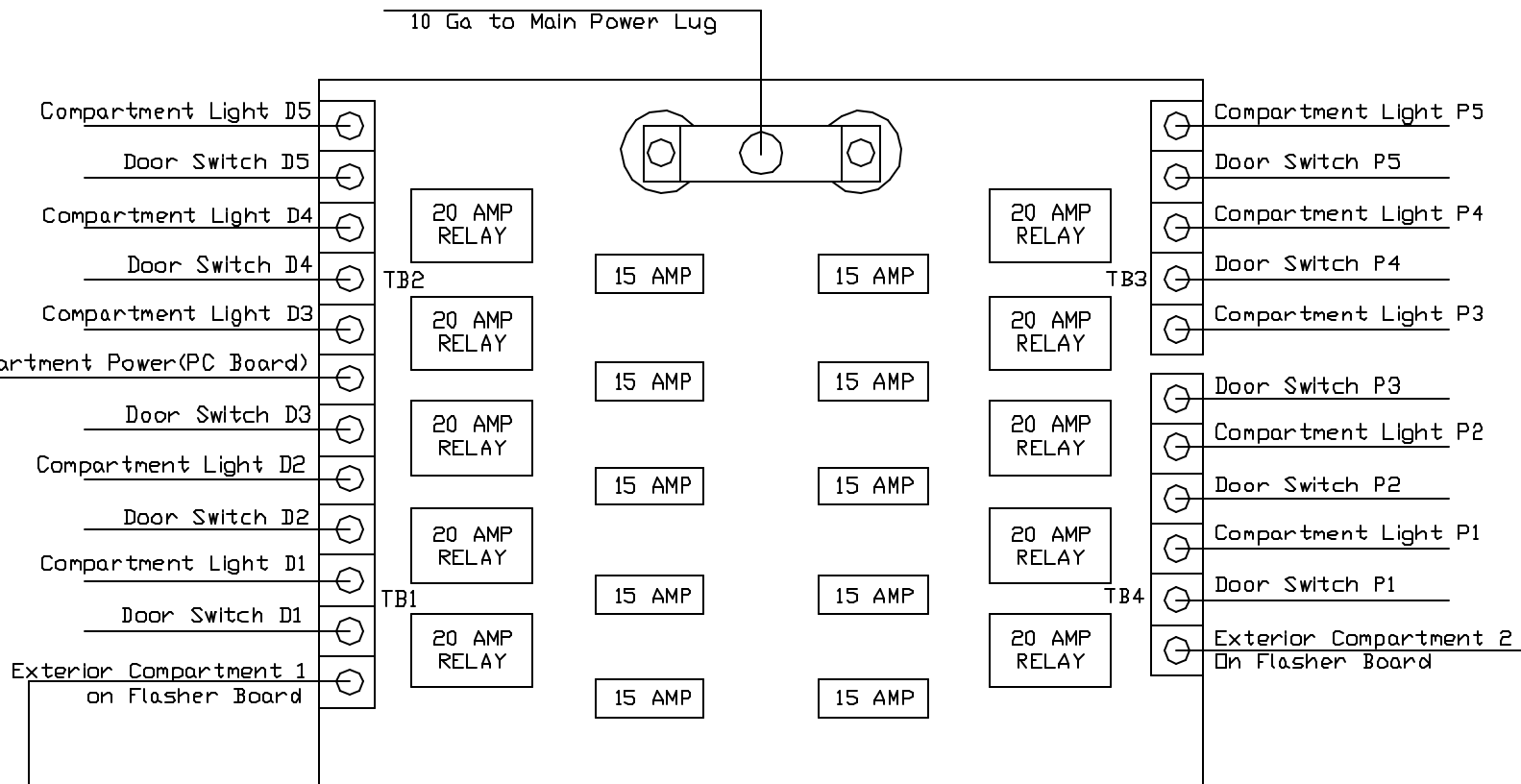
(SEQ) center & left pins:
 work with mod disconnect only
 center & right pins:
 work with load manager/sequencer

JMP2: Heat/Cool

(SEQ) center & left pins:
 work with mod disconnect only
 center & right pins:
 work with load manager/sequencer

MEDTEC
 A PIERCE COMPANY

SCALE: FIT	APPROVED BY:	DRAWN BY: R/WB
DATE: 9/8/99	Herman Mullet	REVISED:
PART NAME: Load Manager/Sequencer		
Dip Switch Settings		DRAWING NUMBER: 4-13.DWG



MEDTEC
A DIERCE COMPANY

SCALE: Fit

DATE: 1/22/03

APPROVED BY:
Herman Mullet

DRAWN BY: SEB

REVISÉ:

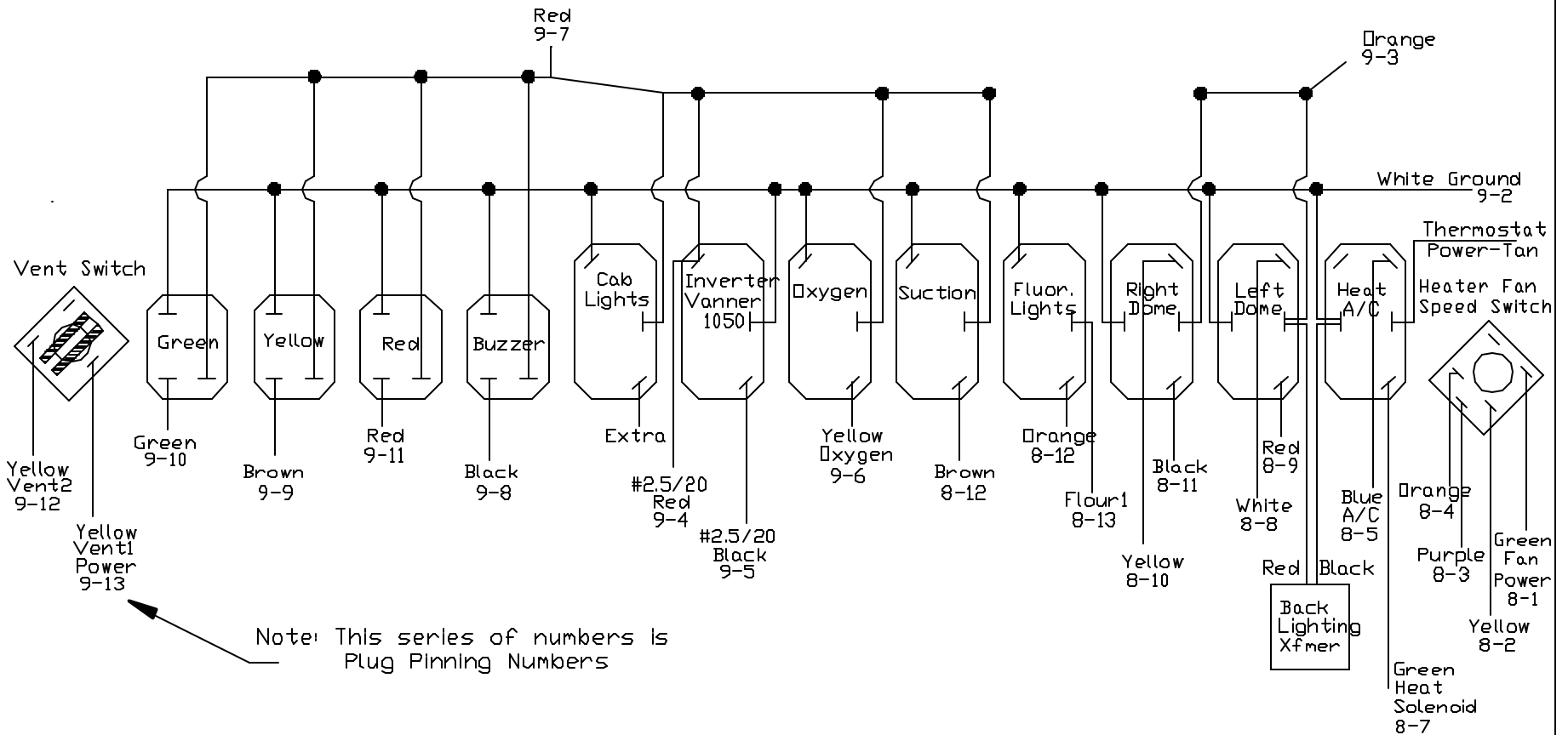
PART NAME:

Compartment PC Board-MD0202

Self-Diagnostic

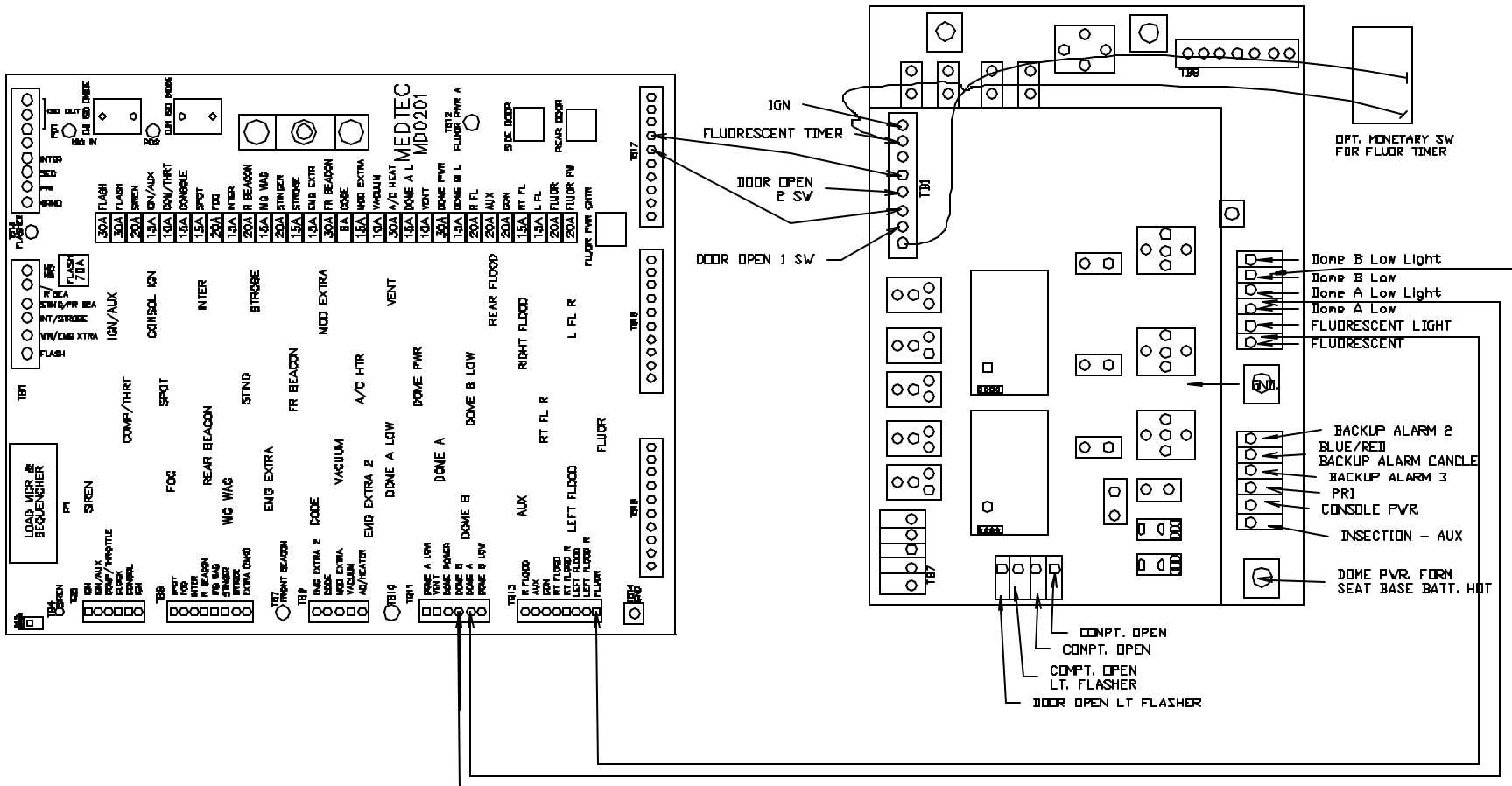
DRAWING NUMBER: 4-14.DWG

4-15



Back Side of Rear Switch Panel

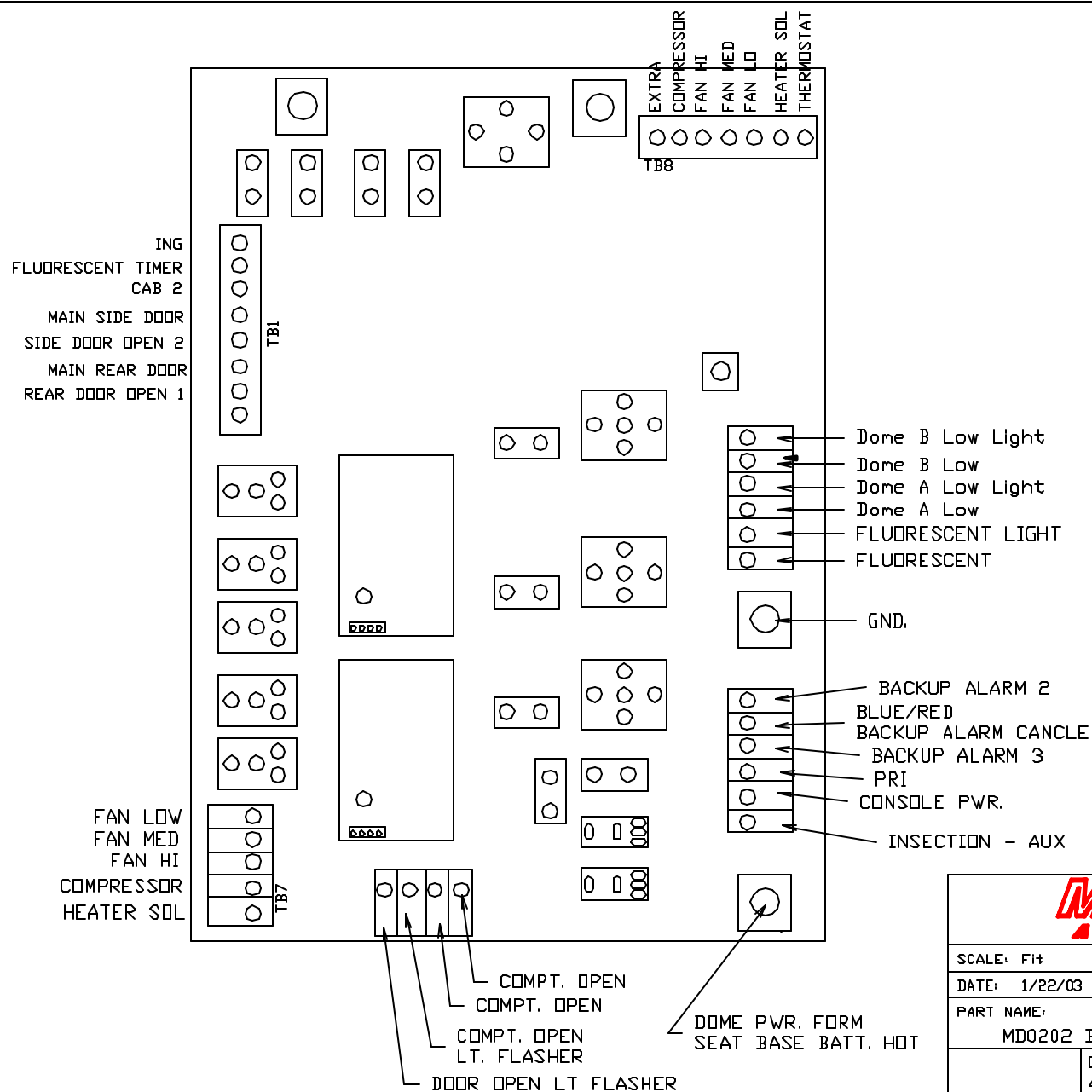
MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME: Rear Switch Panel		
Self-Diagnostic		DRAWING NUMBER 4-15.DWG



MEDTEC
A PUNCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME:		
DOME TIMER + OPTIONAL FLUOR. TIMER		
MD0201	DRAWING NUMBER: 4-16.DWG	

4-17



MEDTEC
A FERRIS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 1/22/03	Herman Mullet	REVISED:
PART NAME:		
MD0202 BOARD		
DRAWING NUMBER:		4-17.DWG

INSTRUCTION MANUAL

LOAD MANAGER

**A START-UP AND SHUT DOWN
LOAD SEQUENCER AND
AUTOMATIC LOAD SHEDDING SYSTEM**

**MODEL #091-32****3 YEAR WARRANTY**

KUSSMAUL ELECTRONICS CO., INC.
170 CHERRY AVE., WEST SAYVILLE, N.Y. 11796

TEL: In NY 516-567-0314

TOLL FREE: 800-345-0857

FAX: 516-567-5828

INTRODUCTION

The LOAD MANAGER is a device which:

1. Sequentially energizes and deenergizes relays at approximately 1/2 second intervals in order to reduce transients in a vehicle's electrical system.
2. Detects when the vehicle's electrical load is greater than the output of the alternator. When this occurs, loads are sequentially deenergized until the alternator output is equal to the load.

The LOAD MANAGER features an input which permits selecting the load shedding feature or operating only as an automatic load sequencer. It is possible to completely override the LOAD MANAGER and operate all relays simultaneously by connecting one input to the vehicle ground. An indicator circuit is included to operate a small LED indicator panel. This provides the vehicle's driver with the information that the LOAD MANAGER is active and loads are being removed from the system.

LOAD MANAGEMENT PROGRAMMING

Recognizing that priorities may change after an installation is made, the LOAD MANAGER is designed so that the sequence of load removal may be easily altered.

At installation, the highest priority load is wired to relay 1 which is operated by terminal 3. (NOTE THAT THE RELAYS ARE NOT PART OF THE "LOAD MANAGER" AND ARE SUPPLIED BY THE INSTALLER) The second highest priority load is wired to relay 2 which is operated by terminal 4. A total of 7 relays, decreasing in priority are operated by terminals 5, 6, 7, 8, & 9. See the schematic of figure 1.

Upon start-up, when the LOAD MANAGER operates as a sequential loading device, the loads are applied in priority order with the highest priority first.

When the LOAD MANAGER feature is enabled and excessive electrical loads cause a drop in battery voltage, the LOAD MANAGER will deenergize loads at approximately 60 second intervals starting with the lowest priority. Loads will be removed until the voltage returns to normal.

After installation the user may vary the priority by altering the switch setting from the BASIC SETTINGS illustrated in figure 2.

CAUTION

**There are 5 switches, each with 5 levers.
Only one lever on each switch may be
in the "ON" position.**

Each switch controls the operation of a relay. The actuation sequence of a particular relay is controlled by the individual levers of each switch. Lever #5 is the lowest priority, while lever #1 is the highest. It is thus possible to arrange the relay operating priority for the 5 lowest priority relays.

NOTE

The LOAD MANAGER is designed to operate relays. It is not necessary to connect to all outputs. Any outputs, at the discretion of the installer, may remain unused. Nothing should be connected to the unused outputs. Relays must have a coil resistance of 40 ohms or greater.

**DO NOT LOAD ANY OUTPUT WITH A RELAY WITH A
RESISTANCE LESS THAN 40 OHMS**

APPLICATION NOTES FOR MODEL 091-32 LOAD MANAGER

The Load Manager is a control which sequentially energizes and deenergizes 7 relay circuits by connecting the coils of these relays to ground. In addition a voltage sensor senses the vehicle's battery voltage and when this drops below a preset level, the Load Manager will deenergize relays until the sensed voltage has stabilized.

With this general operation in mind the following is a brief discussion of the function of each of the pins.

Pin 1: This is the +12 volt power which energizes the Load Manager. It also is the point at which the vehicle's voltage is sensed. Pin 1 must be connected to a good, solid +12 volt source as close to the battery as practical. Any voltage drop between the battery and the sensing point will appear to the Load Manager as a reduction in battery voltage. This will then cause the Load Manager to shed some loads.

Pin 2: This pin is a manual override of the Load Manager. Grounding pin 2 will energize all of the relays and bypass the Load Manager. No other inputs are required except the proper connection to the load relays. Grounding pin 2 is an excellent way to verify the relay wiring on installation or to bypass the Load Manager in case of a malfunction.

Connection to pin 2 is not required for Load Manager operation.

Pin 3, 4, 5, 6, 7, 8 & 9: These pins connect to the "low" side of the relays. The relay coils must be energized with +12 volts and connection to ground is made through the Load Manager. The installation instructions show that the manual control switch for each relay is wired to the "low" side. This is the usual arrangement. It is not the only configuration that is possible. The individual load switches can be wired to the supply side of the relay. The only requirement is that the Load Manager must be the device that grounds the relay.

Pin 10: This is the ground pin for the Load Manager. Pin 10 is the power and signal ground. It must be connected to a good ground or returned directly to the battery negative. Any voltage drop between the point where pin 10 is connected and the battery (-) will be sensed as a decrease in battery voltage and will raise the voltage at which load shedding starts. A good check of an installation is to use a sensitive voltmeter and measure the voltage between pin 10 and the battery (-) post. This voltage should not exceed .050 volts for all the load relays energized. Note that pin 10 carries the total current of all the 7 relay coils connected to the Load Manager output. This can be as high as

1 ampere. For a 10 ft. long wire connected to pin 10 this would require a minimum wire size of #14 AWG.

Pin 11: This is the output to the display. The Load Manager display contains two LEDs. One LED, the green one, is illuminated whenever the +12 volts is applied to the display. This indicates that the load management circuit is active. The red LED is illuminated by grounding the yellow wire of the display. This is done by pin 11 and occurs when the Load Manager senses a low voltage.

Pin 12: This is a +12 volt input which starts the sequential switching of the relays. Applying +12 volts to pin 12 energizes the relays at approximately 1/2 second intervals. Removing the +12 volts from pin 12 will sequentially open the relays at approximately 1/2 second intervals. This voltage must be 12 volts or not less than .20 volts below the battery voltage. BEWARE OF LOW VOLTAGE!

Pin 13: This pin is not used and no connection should be made to it.

Pin 14: This pin turns "ON" the voltage sensor in the Load Manager. Applying +12 volts to pin 14 will make the Load Manager shed loads that cause the voltage at pin 1 to drop below 11.5 volts (12.3 volts for PIE units). If pin 14 is not connected, the Load Manager is a simple sequencer. When pin 14 and pin 12 are simultaneously supplied with +12 volts the Load Manager will sequence the loads "ON" and sheds excessive loads simultaneously.

ABOUT LOAD SHEDDING

The Load Manager voltage sensing circuit has been designed to react very slowly to drops in voltage. This is necessary to eliminate nuisance shedding due to transients and temporary drops in voltage. The actual response time in any installation can vary widely for two reasons: 1. the number and capacity of the batteries and 2. the amount of current that the loads draw in excess of the alternator output.

Consider two installations. The first with only a single battery and the second with six batteries in parallel. Now for any given overload, the voltage of the single battery will decrease much more rapidly than the voltage of the six batteries in parallel. Thus the Load Manager will detect the overload sooner with the single battery and start to shed loads.

Similarly for any battery configuration, if the overload, the amount that the load current exceeds the alternator output, is larger, then the battery voltage will drop faster and load shedding will occur sooner.

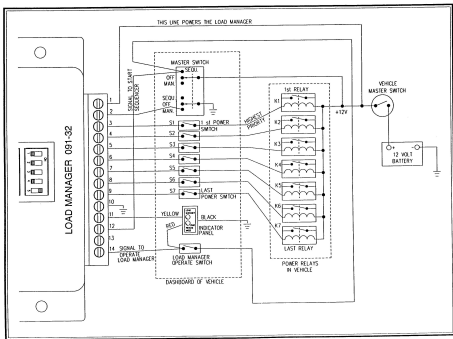


Figure 1, Schematic, Load Manager Installation

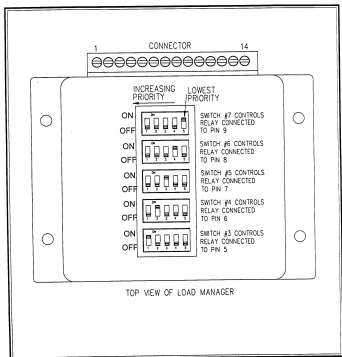


Figure 2, Basic Switch Settings

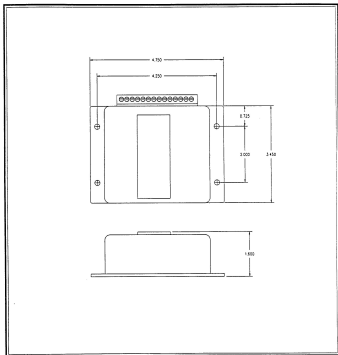


Figure 3, Outline, load Manager

INSTALLATION RECORD & WARRANTY

Date Installed _____

Installed By _____

Vehicle Identification _____

Vehicle Owner _____

WARRANTY

All products of Kussmaul Electronics Company Inc. are warranted to be free of defects of material or workmanship. Liability is limited to repairing or replacing at our factory, without charge, any material or defects which become apparent in normal use within 3 years from the date the equipment was shipped. Equipment is to be returned, shipping charges prepaid and will be returned, after repair, shipping charges paid.

Kussmaul Electronics Company, Inc. shall have no liability for damages of any kind to associated equipment arising from the installation and /or use of the Kussmaul Electronics Company, Inc. products. The purchaser, by the acceptance of the equipment, assumes all liability for any damages which may result from its installation, use or misuse, by the purchaser, his or its employees or others.



MEDTouch Switch Panels

Operating Procedures

& Ordering Guide

Medtec Ambulance Corporation

64697 U.S. 33

Goshen, IN 46526 USA

Ph-(574) 534-2631 Fx- (574) 534-3629

www.medtecambulance.com

An Oshkosh Truck Corporation Company



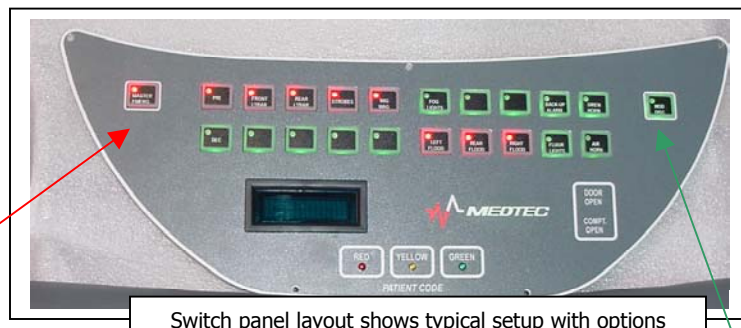
MEDTouch Switch Panels

Medtec Ambulance Corporation brings you the best of two worlds- solid state, reliable, sealed switches, and Medtec's field proven, self-diagnostic power distribution system. This mating of modern, high tech switch panels with the highly reliable and easy-to-troubleshoot Medtec "big-board" power distribution panel is an evolutionary step in the most trouble-free electrical system in the ambulance industry! We've already made it easy, now we've made it more attractive, more functional and even more durable. Yes, the **MEDTEC** logo still flashes the QRS wave and on **both** the front and rear panels!

OUTLINE

I. QwikOps – Front Panel

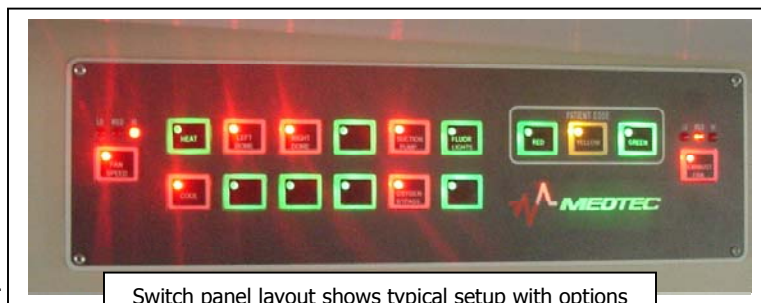
- A. Starting the vehicle
 1. Fasten Seat Belts
 2. Ignition ON
 3. Glow plug indicator OFF
 4. Start the engine
- B. Emergency Master-Primary Mode sequences to ON
- C. Turn ON Mod Disconnect (pre-Heat or Cool Patient Compartment)
- D. Exit the facility
- E. Siren to ON (Auxiliary Panel function- See Appendix)
- F. Drive Safely to the Call
- G. Shift to Park and Apply Emergency Brake
- H. Secondary Mode
- I. Treat and package patient for transportation
- J. Run HOT (if necessary) to medical facility
 1. Check- Mod Disconnect ON
 2. Primary Mode
 3. Siren to ON (Auxiliary Panel function)
 4. Release Emergency Brake
 5. Shift to Drive
 6. Drive safely to medical facility
- K. Siren to OFF
- L. Park and Emergency Brake applied
- M. Medtec automatic Mod Disconnect shuts conversion down in 5-minutes when ignition turned OFF
- N. Monitoring of chassis power generating system (alternators and batteries) is accomplished with the three-function liquid crystal diode (LCD). Total amperage draw, battery output voltage and alternator status are displayed. (See Appendix V, Photo 1)
- O. Patient Status Indicators (Red, Amber, Green) are switched in the Patient Compartment by Medic to indicate change in patient condition.



II. QwikOps – Rear Panel

NOTE: To operate any of the Controls on this panel, the Mod Disconnect Switch on the front switch panel, must be in the ON position.

- A. Secure the patient for transport
- B. Check ABC's and remediate if necessary
 1. May require use of Suction Pump control (Switch marked with RED Border)
 2. May require use of Oxygen control (optional)
- C. Select proper interior lighting
 1. Left Dome- LO or HI
 2. Right Dome- LO or HI
- D. Select Heat or AC on Rear Switch Panel
 1. Select Fan Speed (LO, MED, HI)
- E. Select relevant Patient Code (RED, AMBER, GREEN) to notify driver
- F. Select Exhaust Fan (LO, MED, HI) if required
- G. Select any other switch-controlled equipment if necessary
- H. Monitor patient and provide treatment as required
- I. Secure patient for arrival at medical facility
- J. No need to turn anything OFF, except ignition switch, automatic Mod Disconnect will occur in 5-minutes to protect vehicle batteries



NOTE: The above operational scenarios may vary based upon departmental protocol and optional equipment available on specific Medtec ambulances.

III. Components of the System

- A. The **MEDTouch** Switches
 1. Silicon rubber switch caps are tough for high duty cycle
 - a. Underwriters Laboratories, Inc. Certifies Flammability characteristics
 - b. Tensile Strength of 70 Kg/cm²
 - c. Tear Strength of 13 Kg/cm
 - d. Operating Temperatures- -40C to +85C
 2. Life Cycle Tested to over 500,000 cycles
 - a. At 50 pushes per day, the life of each switch is 27.39 YEARS
 3. Silicon rubber gasket caps seal the switch position from moisture
 4. High Daytime/Nighttime Visibility switch caps and LED indicators
 - a. Switch cap shows GREEN and no LED indicator when OFF
 - b. Switch cap shows RED and RED LED when ON
 - c. Panel light intensity controlled by chassis headlight rheostat
 5. Audible tone indicates change in switch condition; i.e. OFF to ON, ON to OFF
 6. Easily replaceable switch legends for increased flexibility in labeling
 7. Switch caps provide good tactile feedback with 0.050" travel



8. Selectable functions for twelve of twenty-two switches (See Appendix IV Switch Panel Function Matrix)
- B. Switch Panel Substrate
1. Panel base is .090" aluminum for strength and durability
 2. Panel face is .015" Lex-Edge silk-screened vinyl
- C. Front Switch Panel Electronics (See Appendix V, Photos 2, 3)
1. Ten switches with dedicated basic functions
 2. Twelve switches with selectable functions
 3. Machine populated, wave-soldered, printed circuit boards
 4. Components matched to function requirements for reliability
 5. All switch control outputs are fuse protected
- D. Rear Switch Panel Electronics (See Appendix V, Photos 2, 3)
1. Ten switches with dedicated basic functions
 2. Seven switches with selectable functions
 3. Machine populated, wave-soldered, printed circuit boards
 4. Components matched to function requirements for reliability
 5. All switch control outputs are fuse protected
- E. Panel Harness- Interconnection with Main Wiring Harness (see Appendix V, Photos 4, 5)
1. Multi-conductor panel harness snap-plugs directly to six function-specific receptacles strategically located on the backside of the panel
 2. Back end of Panel Harness mates directly with automotive-style snap-block connectors with Main Harness to Power Distribution Panel in electrical cabinet
 3. Panel Harness is custom pinned to allow flexibility in switch function based upon switch function selection (See Switch Function Selection PDF in Appendix IV)
- F. Main Harness-Interconnection with Power Distribution Panel
1. Medtec **standard** Main Harness
 2. Same familiar configuration for easy troubleshooting and service
- G. Medtec **standard** Power Distribution Panel
1. Same LED diagnostic system
 2. Same commonly purchased circuit breakers and relays with spares provided
 3. Same familiar configuration for easy troubleshooting and service
- H. Medtec **Generation III** Electrical Schematics
1. Up-dated to reflect **MEDTouch** Switch Panels, interconnecting Panel Harness and Siren/Auxiliary Panel switch functions



2. Packaged in convenient CD in each New Vehicle Owner's Manual
 3. Easy-to use Acrobat PDF formatted files
- I. Flexibility in Function with both Medtec and Customer programmability
1. Sequence emergency lighting ON with Emergency Master Switch
 - a. Medtec pre-set to include Switches 2-10
 - b. Dealer/Customer programmable from front of Panel (See Appendix IV)
 2. Change function of twelve selected switches to meet Customer requirements
 - a. Switches 5-13, 16, 19 and 21 can be programmed to perform selected functions (See Switch Panel Function Matrix in Appendix)
 - b. Medtec programming
 3. Switch Legends are easy to replace and are back lighted with the switch cap LED
 - a. GREEN in OFF status
 - b. RED in ON status
 - c. Switches not selected to perform a specific function will have blank (gray) legend inserts
- J. Siren/Auxiliary Panel adds even more flexibility
1. Four (4) standard rocker switch locations available for any unique controls and indicators, such as:
 - a. Dedicated, protected switch for On-Spot or Rudd Tire Chains
 - b. Air System Lo-PSI indicator
 - c. Air Dump Override
 2. Select switch locations and functions (See Auxiliary Dash Panel in Appendix III)

IV. Before the Call – Ordering Your Switch Panels

- A. Use the tools provided by Medtec to configure **MEDTouch** Switch Panels for each customer
1. E-Series Chassis (Medtec Models: PD-168, PD, PD-156ext, FD, FD-166, FD-160, FD-144D, FD-144S), AD-170 on GMC/Chevrolet C-4500, and Freightliner M2 Chassis.
 - a. Use PDF format with selectable functions for each switch (See Medtec Standard Switch Panel PDF in Appendix I)
 2. International Type I-AD (Medtec Models: AD-170, AD-166)
 - b. Use PDF format with selectable functions for each switch (See Medtec Standard Switch Panel PDF in Appendix II and Photo 6 in Appendix V)
 - c. Use printed form of Switch Panel layout to identify function of each switch (See Medtec Standard Switch Panel print on 2003 Dealer Support Tools CD)
 - d. FAX or mail copy with your Order packet
 3. **MEDTouch** Switch Panels NOT AVAILABLE AT THIS TIME for:
 - a. F-Series Chassis- (Medtec Models: PD-146, FD-144)

- c. Use printed form of Switch Panel layout to identify function of each switch (See Medtec Standard Switch Panel print on 2003 Dealer Support Tools CD)
 - d. FAX or mail copy with your Order packet
- B. Switches Not in Compliance with **MEDTouch** Switch Panel Requirements
 1. Medtec recognizes that there are certain equipment functions required on some vehicles that do not meet the configuration requirements of the new switch panels; i.e., Tire Chains or other devices requiring a guarded switch
 2. The Auxiliary Dash Panel (See Appendix III) provides four blank switch locations of a size and style of the "old" Medtec switch panel – this type of switch may be located in this panel.
 3. To order a switch in this Auxiliary panel, complete the drawing by indicating the position of the switch and the function it performs. Fax or mail this drawing with your order.



APPENDIX II – Switch Selection .PDF – International Chassis

FRONT- SWITCH POSITION & DESCRIPTION

SWITCH POSITION	DESCRIPTION
1. MASTER EMERGENCY	22. MODULE DISCONNECT
2. PRIMARY MODE	13. REAR FLOOD
3. SECONDARY MODE	15. LEFT FLOOD
4. FRONT LIGHT BAR	16. Select
5. Select	17. RIGHT FLOOD
6. Select	18. BACK-UP ALARM
7. Select	19. Select
8. Select	20. SIREN/HORN
9. Select	21. Select
10. Select	
11. Select	

REAR- SWITCH POSITION & DESCRIPTION

SWITCH POSITION	DESCRIPTION
1. FAN SPEED	6. RIGHT DOMES
2. HEAT SELECTOR	7. Select
3. AC SELECTOR	8. Select
4. LEFT DOMES	9. Select
5. Select	10. SUCTION PUMP
11. Select	
12. Select	
13. Select	
14. RED PATIENT CODE	
15. AMBER PATIENT CODE	
16. GREEN PATIENT CODE	
17. EXHAUST FAN	

Switch Panel Print for Medtec Models: AD-166, AD-170 on International 4300 Chassis
THIS PRINT IS AVAILABLE AS A .PDF FILE AND CAN BE FILLED OUT, PRINTED AND INCLUDED WITH THE ORDER

APPENDIX IV – Medtec Switch Panel Function Matrix

</

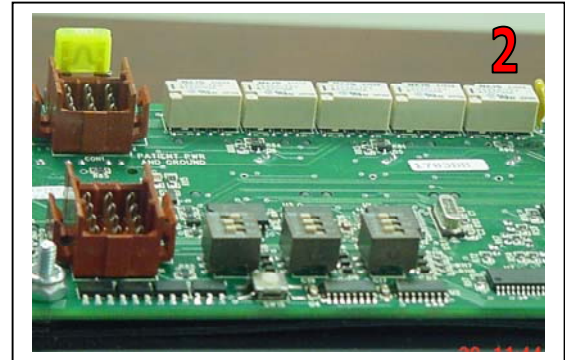
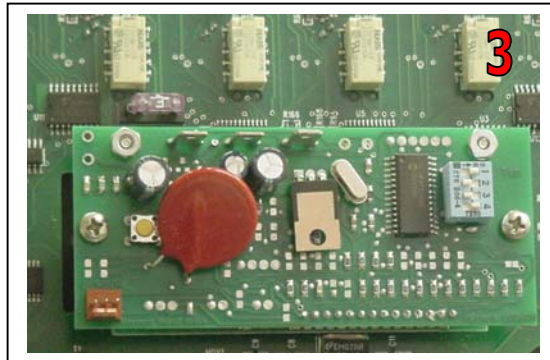
APPENDIX V - PHOTOGRAPHS

1. Volt/Amps/Alternator Status Gauge

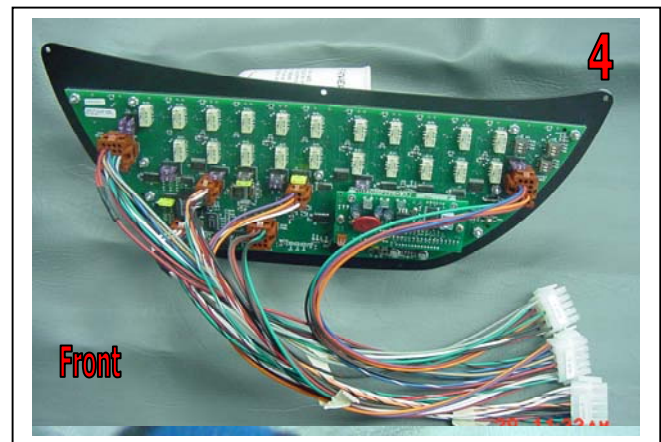
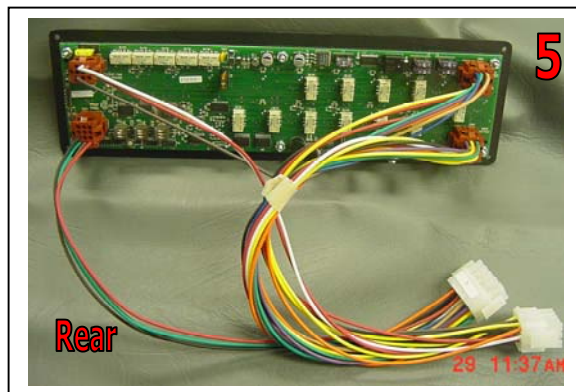
This LCD meter, located in the front switch Panel, continuously monitors alternator(s) output, alternator status and battery voltage. This critical information is updated every four milliseconds.



2 /3. Machine Populated, Wave-Soldered Electronic Components for Reliability Durability and Consistency

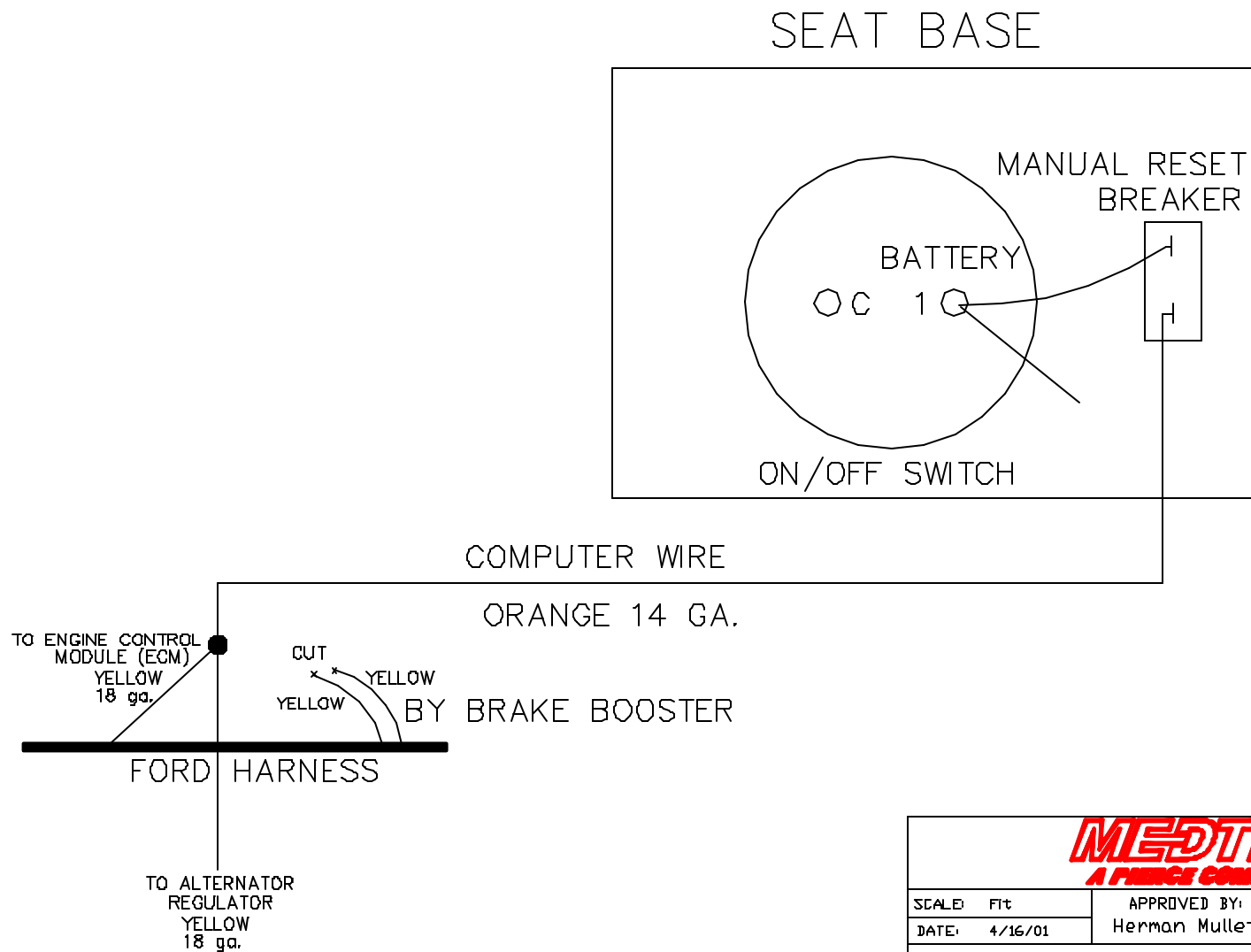


4 /5. Panel Harnesses Interconnect with Main Board

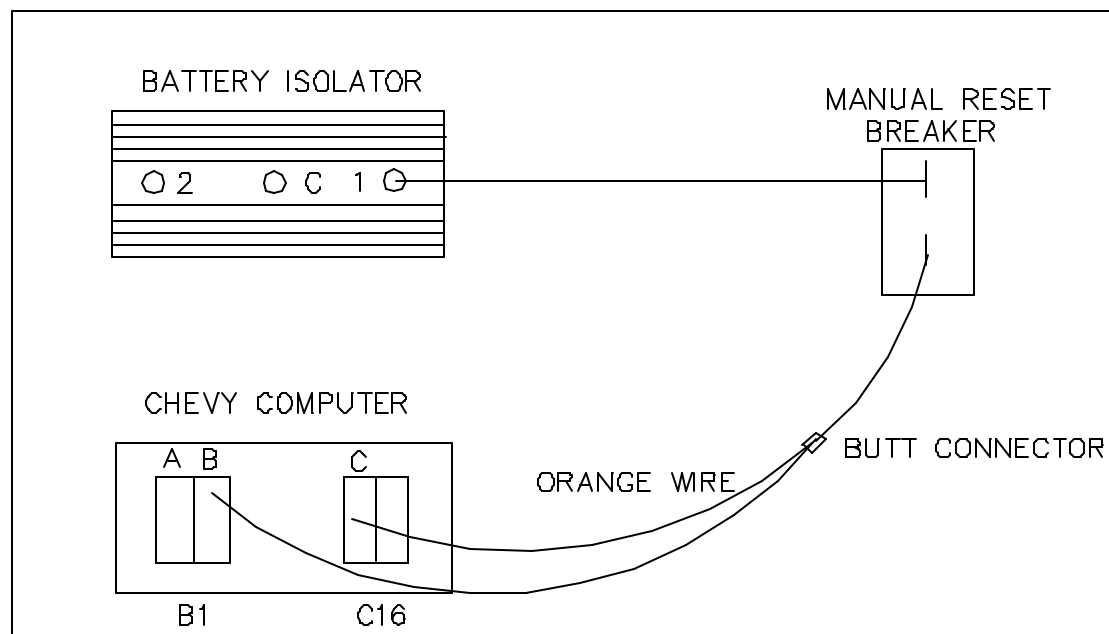


6. Front Panel For International Chassis Incorporates OEM Radio, Emergency Air Brake Control and OEM switches for Easy Access





MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/16/01		REVISED:
PART NAME:	Ford Computer Hookup	
98 - OLDER	DRAWING NUMBER: 5-1.DWG	

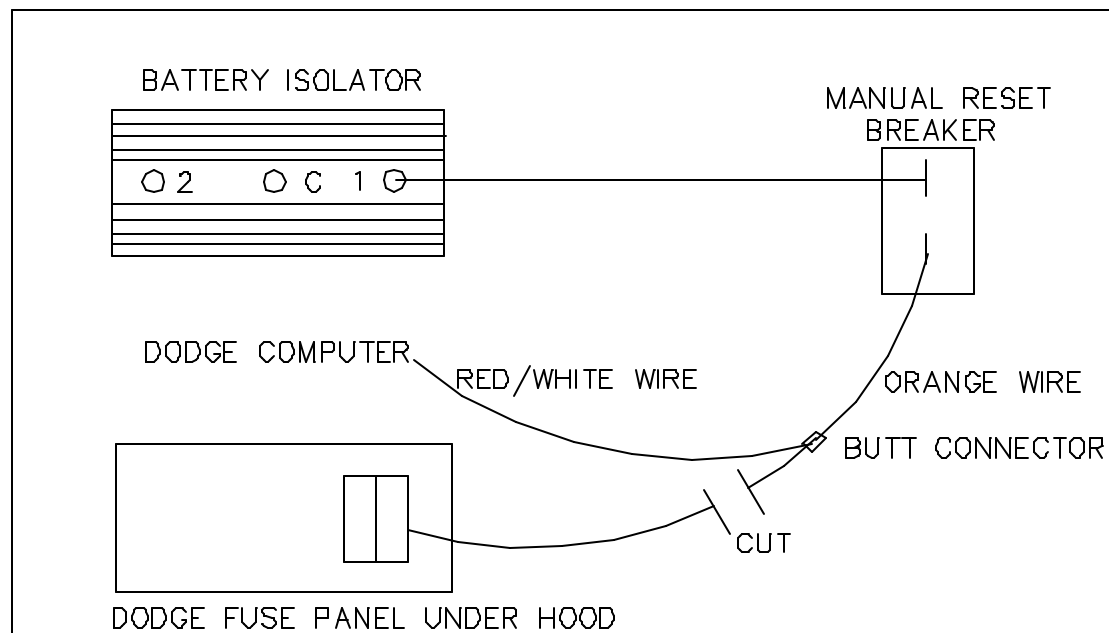


DRIVER'S SIDE SEAT BASE

MEDTEC
A PIERCE COMPANY

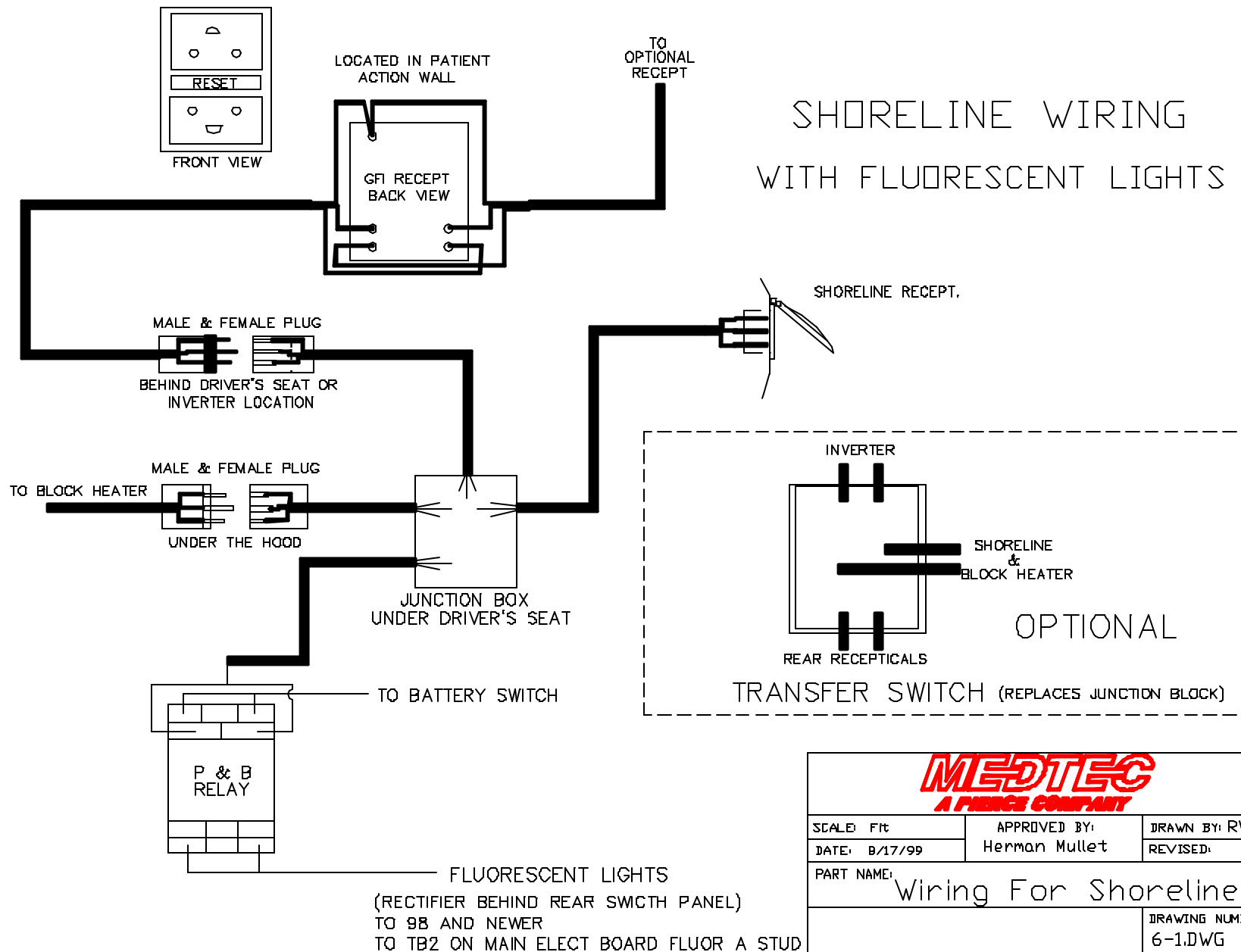
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 4/16/01		REVISED:
PART NAME: 98 Chevrolet Computer Hook-up		
Cutaway		DRAWING NUMBER: 5-2.DWG

5-3



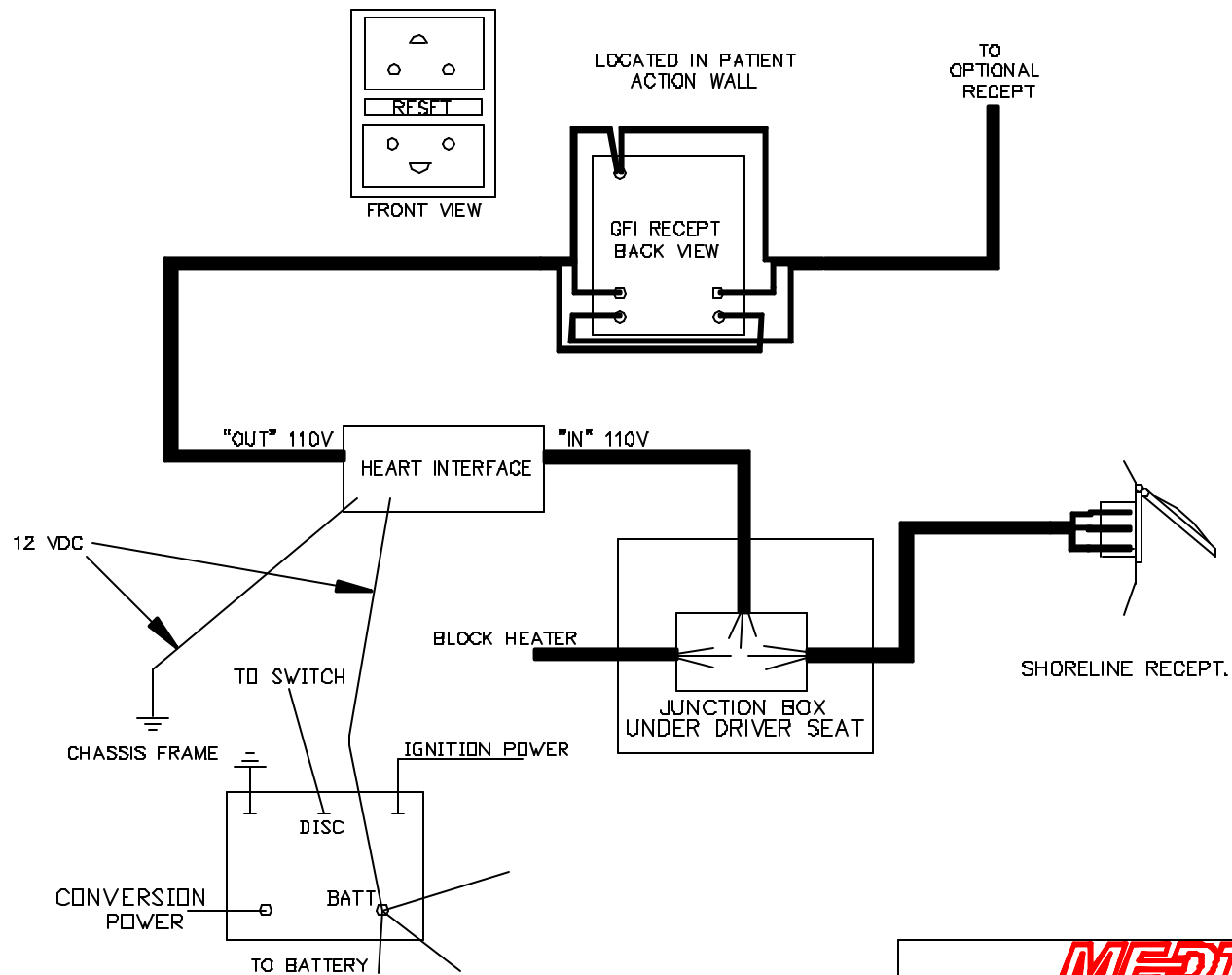
MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/17/99	REVISED:	
PART NAME: 98 Dodge Computer Hook-up		
		DRAWING NUMBER: 5-3.DWG



MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/17/99		REVISED:
PART NAME: Wiring For Shoreline		
		DRAWING NUMBER: 6-1.DWG

6-2



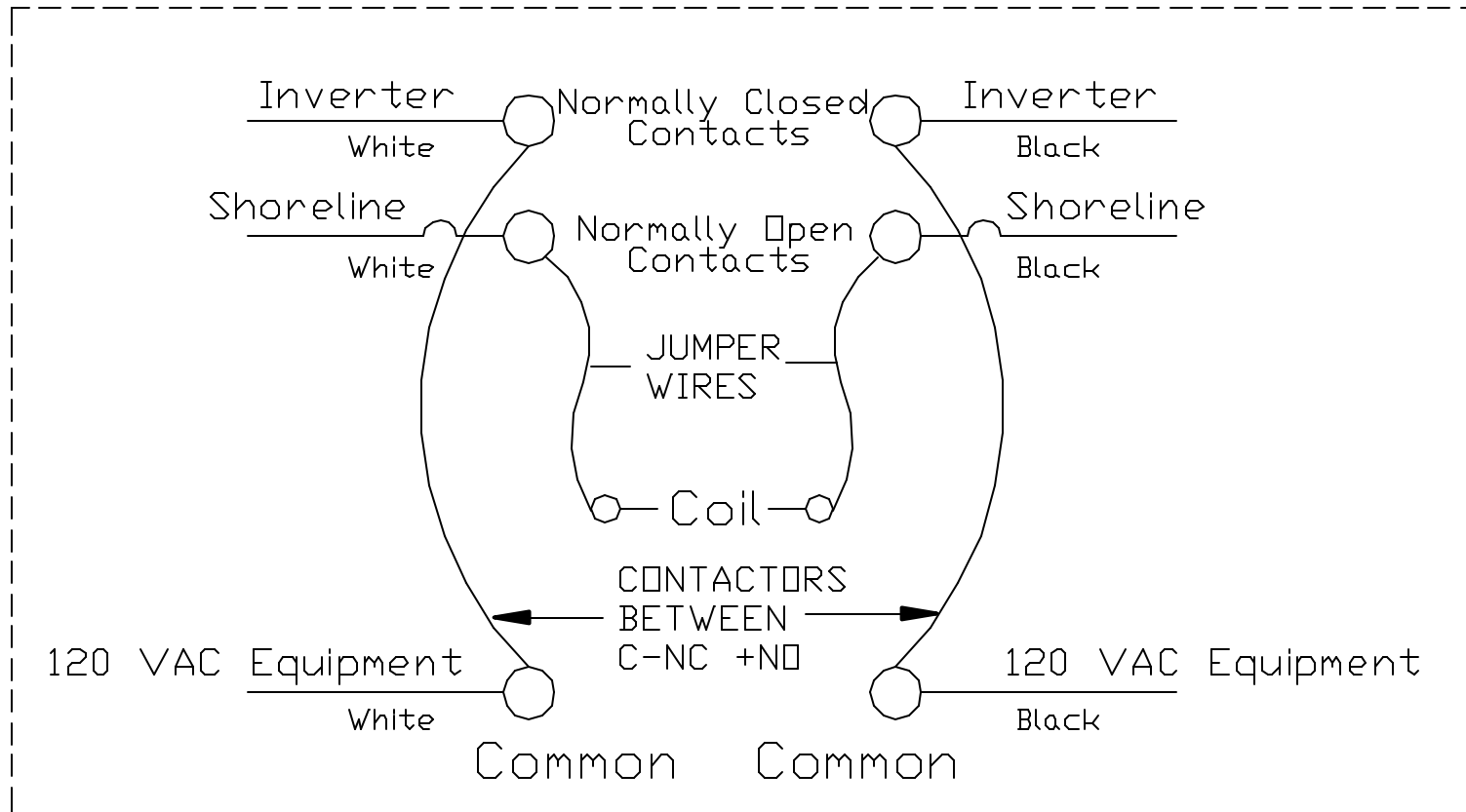
SHORELINE WIRING WITH HEART INTERFACE (ON/OFF COVERSION SWITCH)

MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: R/WB
DATE: 9/9/99		REVISED:
PART NAME: Wiring For Shoreline With Heart Interface		
		DRAWING NUMBER: 6-2.DWG

6-3

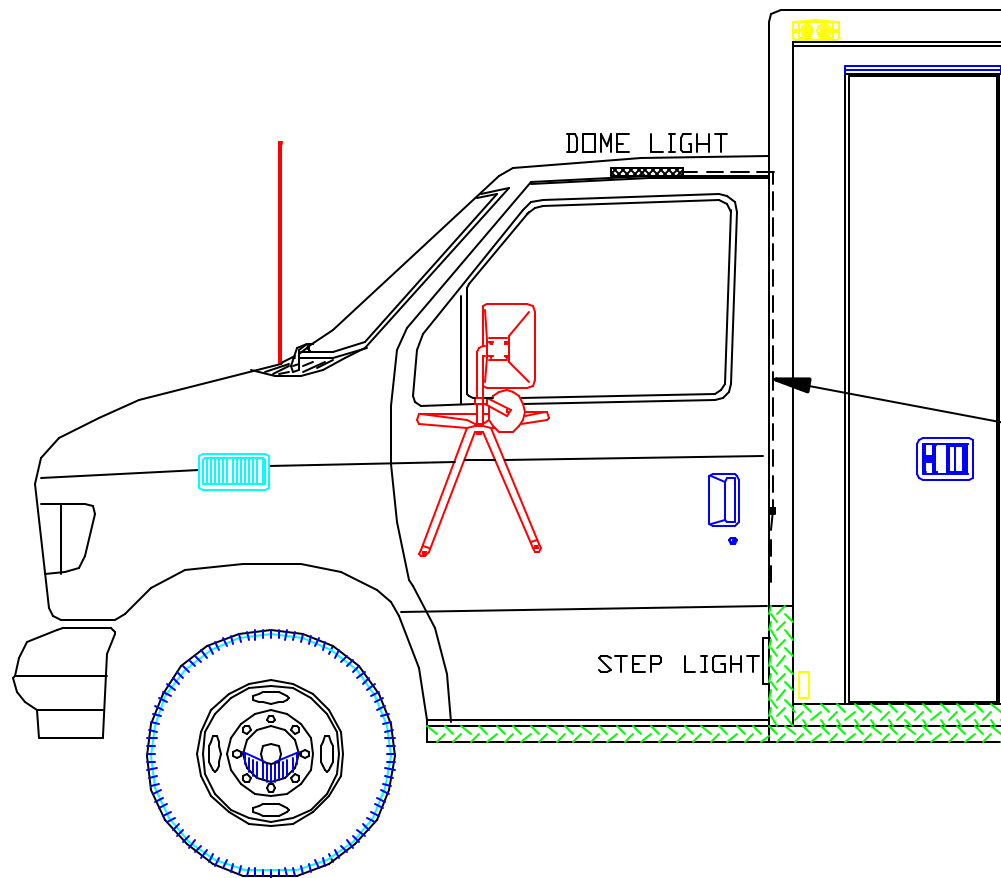
NTE Tranfer Switch Wiring



Enclosure Box

MEDTEC
A FERRIS COMPANY

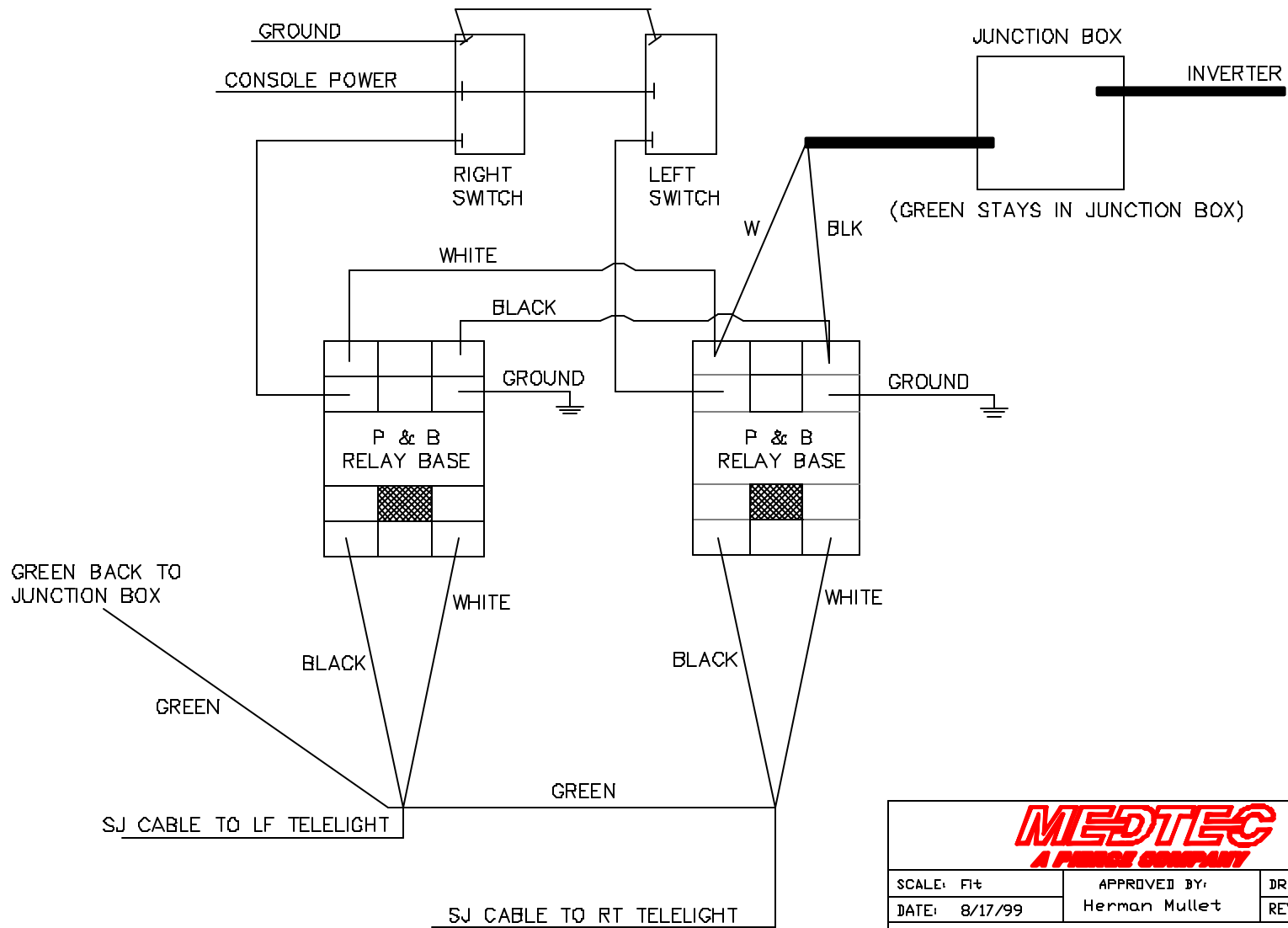
SCALE: FT	APPROVED BY:	DRAWN BY: SEB
DATE: 4/16/01	Herman Mullet	REVISED:
PART NAME: NTE 120VAC Transfer Switch		
		DRAWING NUMBER: 6-3.DWG



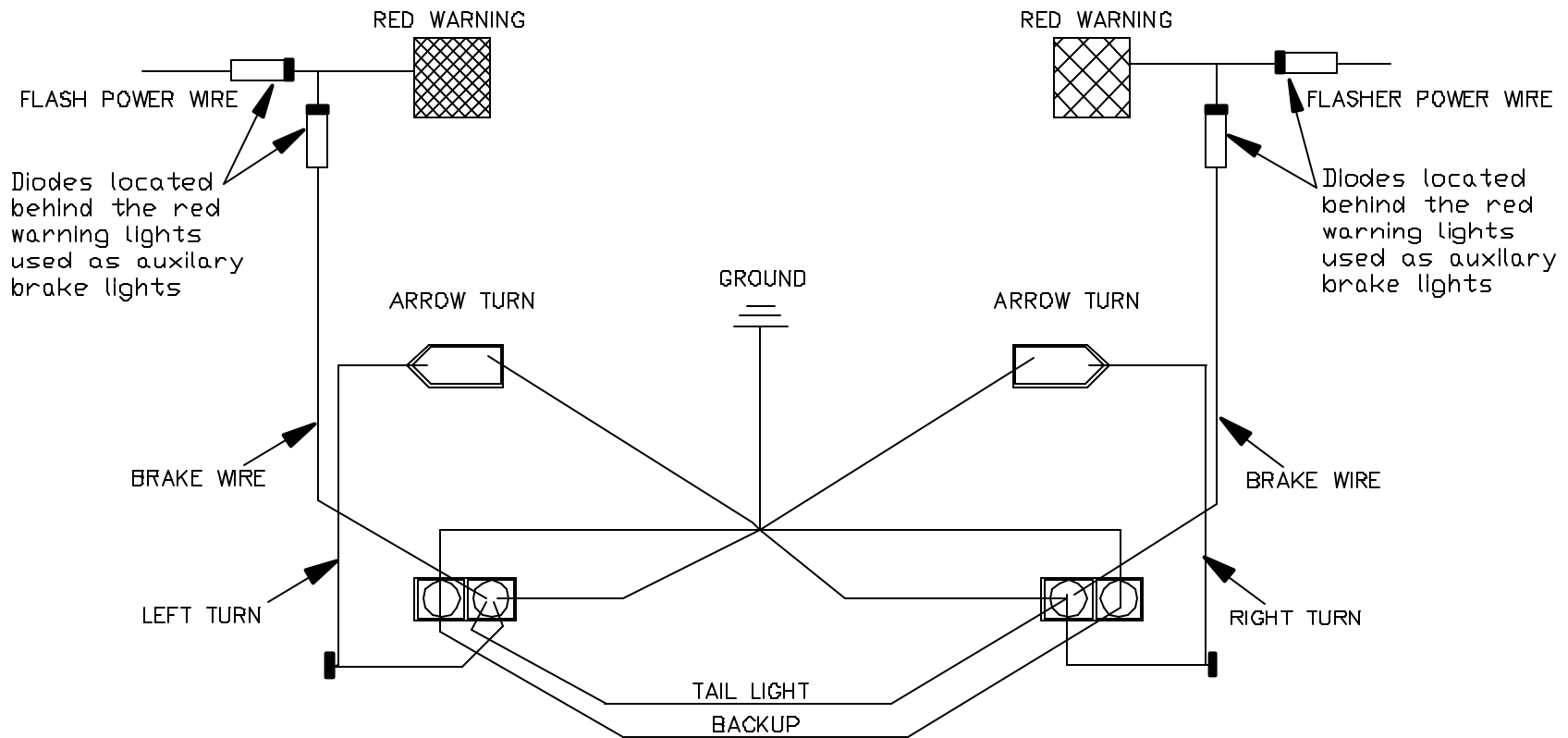
THIS LIGHT IS SELF-GROUNDING
POWER FOR THIS LIGHT
COMES FROM THE CAB DOME LIGHT

MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/17/99		REVISED:
PART NAME: Cab Runningboard Light		
		DRAWING NUMBER: 7-1.DWG

7-2



MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/17/99		REVISED:
PART NAME: Telelight Relay Hookup		
		DRAWING NUMBER: 7-2.DWG



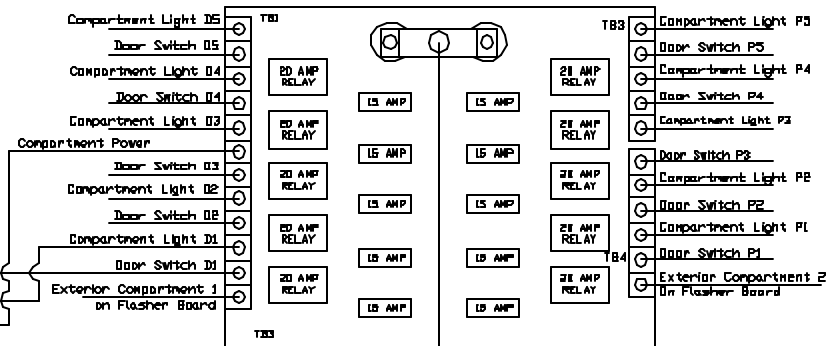
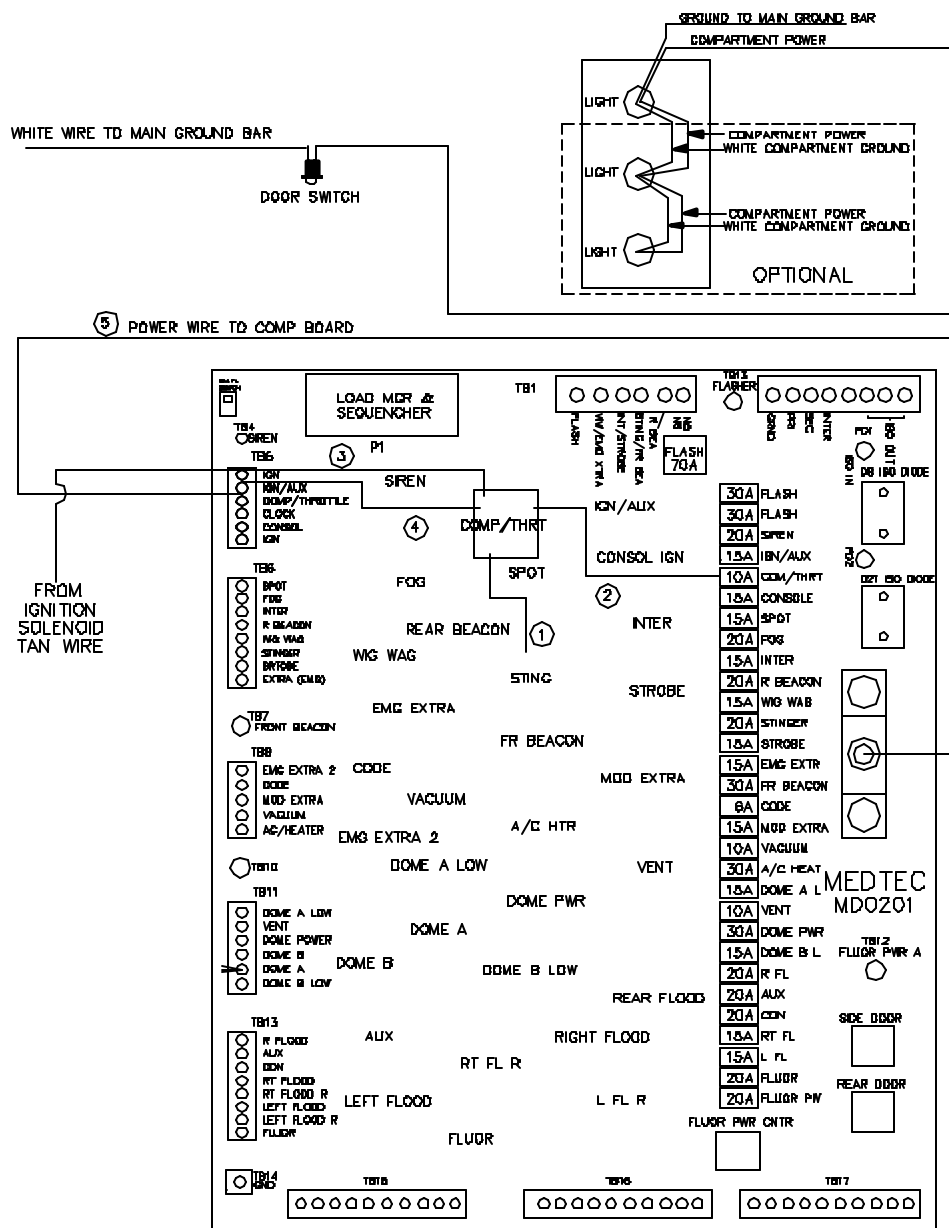
	Brake	Left Turn	Right Turn	Backup	Tail Light	Ground
Ford Mod	Blue	Yellow	Green	Blk/Grn	Brn/Wht	White
Ford Type I	Blue	Grn/Org	Org/Blue	Blk/Pink	Brown	White
Dodge	Blue	Blk/Pink	Grn/Red	Blk/Pur	Blk/Yel	White
Chevy/GM	Blue	Yellow	Dark Grn	Lgt Grn	Brown	Black
Freightliner	Blue	Brown	Yellow	Blue	Green	
International	Blue	Yellow	Green	Blue	Brown	
MEDTEC	Blue	Yellow	Green	BROWN	Brown	White

MEDTEC
A FORD COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/16/01	REVISED:	
PART NAME: Tail Light with Arrow Turns and Extra Flasher		
		DRAWING NUMBER: 7-3.DWG

1. BLUE WIRE FROM SPST SWITCH
TO TERMINAL FOG "IN"
2. COPPER LEAD FROM TERMINAL FOG
"IN" TO 20 AMP FOG RELAY
3. COPPER LEAD FROM 20 AMP BREAKER
TO 20 AMP FOG RELAY
4. COPPER LEAD FROM 20 AMP FOG RELAY TO TERMINAL FOG "OUT"
5. COPPER LEAD FROM 20 AMP FOG RELAY TO GROUND
6. BROWN WIRE FROM TERMINAL FOG "OUT" TO FOG LIGHTS

		
SCALE: 1" = 1'	APPROVED BY:	DRAWN BY: SEB
DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME: Fog & Driving Lights		
MD0201		DRAWING NUMBER: 7-4.DWG

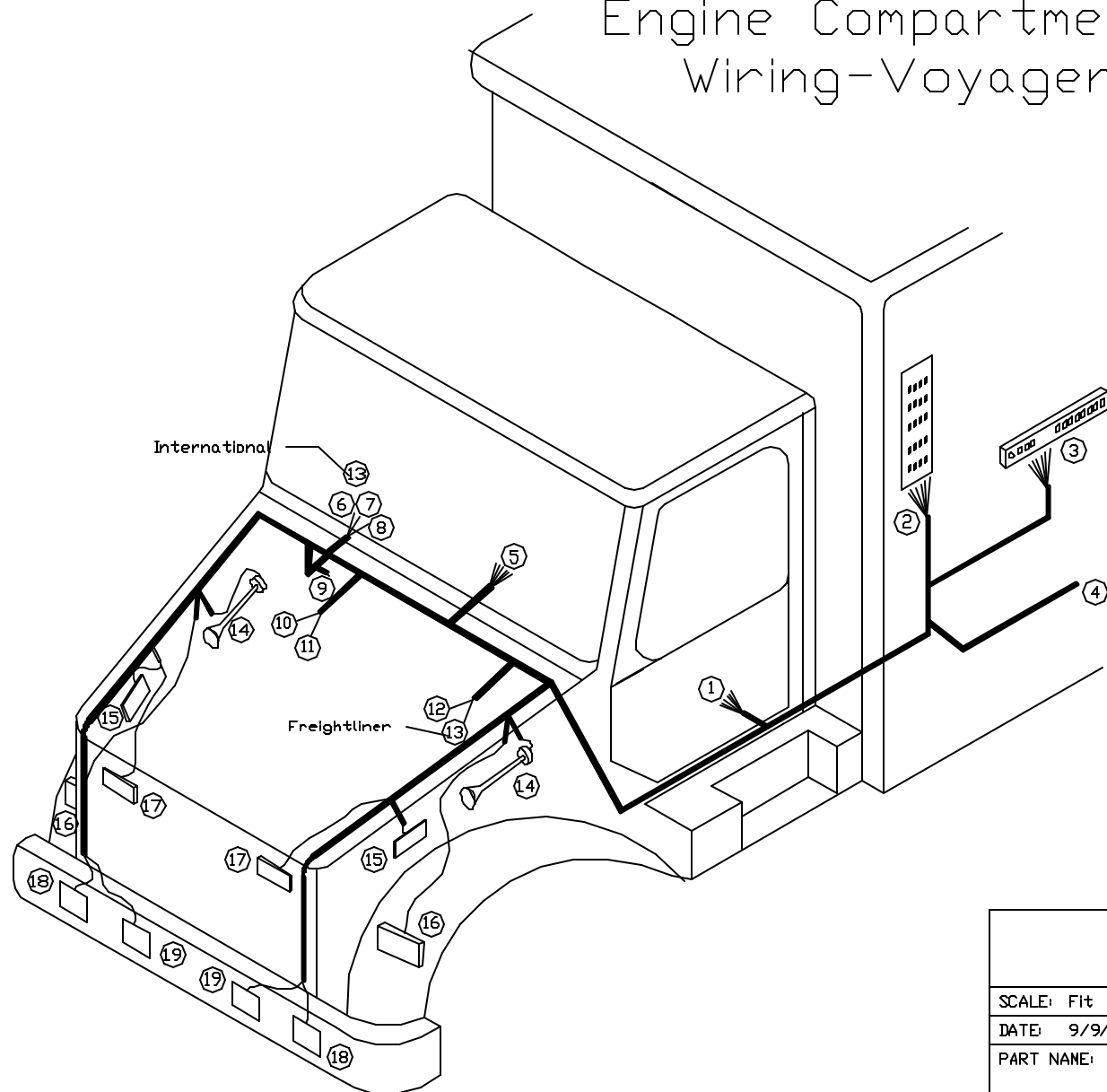


1. COPPER LEAD FROM 20 AMP COMPT RELAY
TO GROUND THROUGH MOD DISCONNECT
2. COPPER LEAD FROM 10 AMP BREAKER
TO 20 AMP COMPT RELAY
3. COPPER LEAD FROM TERMINAL IGN "HOT"
TO 20 AMP COMPT RELAY
4. COPPER LEAD FROM 20 AMP COMPT RELAY
TO TERMINAL COMPT "OUT"
5. POWER WIRE FROM TERMINAL COMPT "OUT"
TO TERMINAL TBI-6

MEDTEC
A PERMCO COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/15/01	Herman Mullet	REVISED:
PART NAME: Power to Compartment Lights		
		DRAWING NUMBER: 7-5.DWG

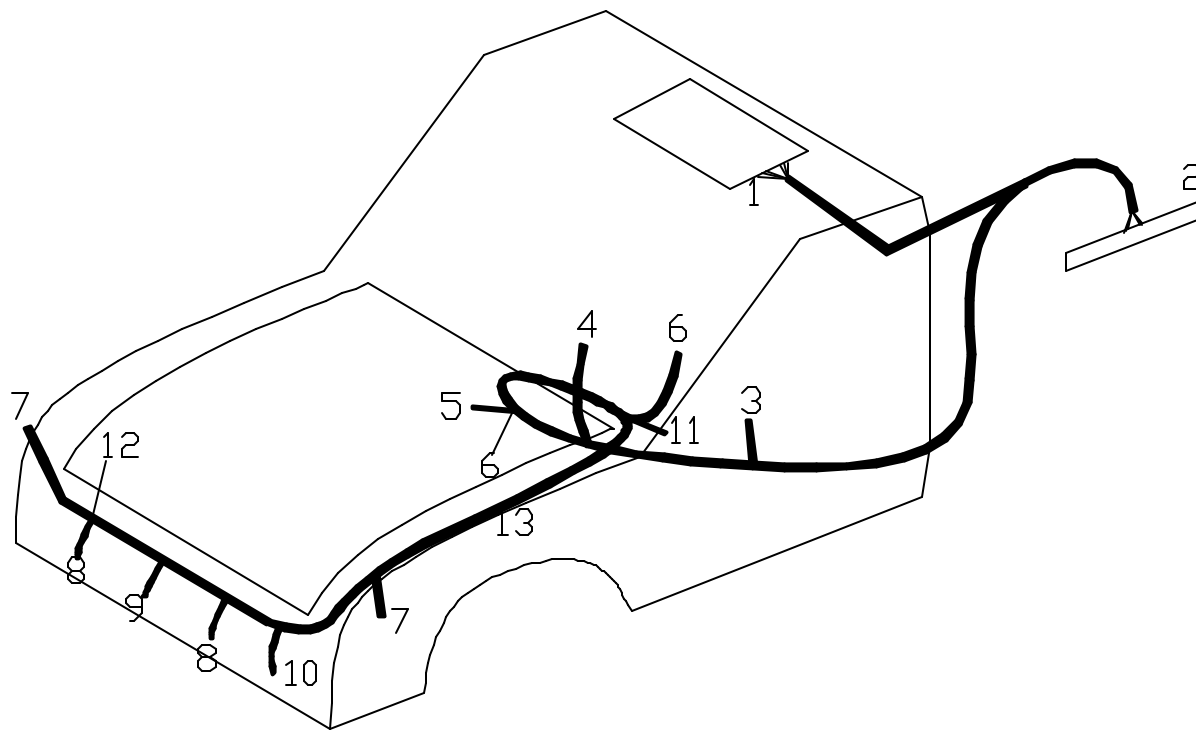
Engine Compartment Wiring-Voyager



1. To Inverter & Battery Switch
2. Main Circuit Board
3. Rear Switch Panel
4. Compartment B
5. Front Cpnsole
6. Ignition Solenoid
7. Instrument Light
8. Neutral Safety
9. Back-up Alarm
10. Vaccum Pump for Heater Solenoid
11. Heater Solenoid
12. Throttle
13. Air Conditioner
14. Air Horns
15. Intersection Lights
16. Wig Wag (Headlights)
17. Front Grille Lights
18. Siren Speakers
19. Fog Lights

MEDTEC
A PIERCE COMPANY

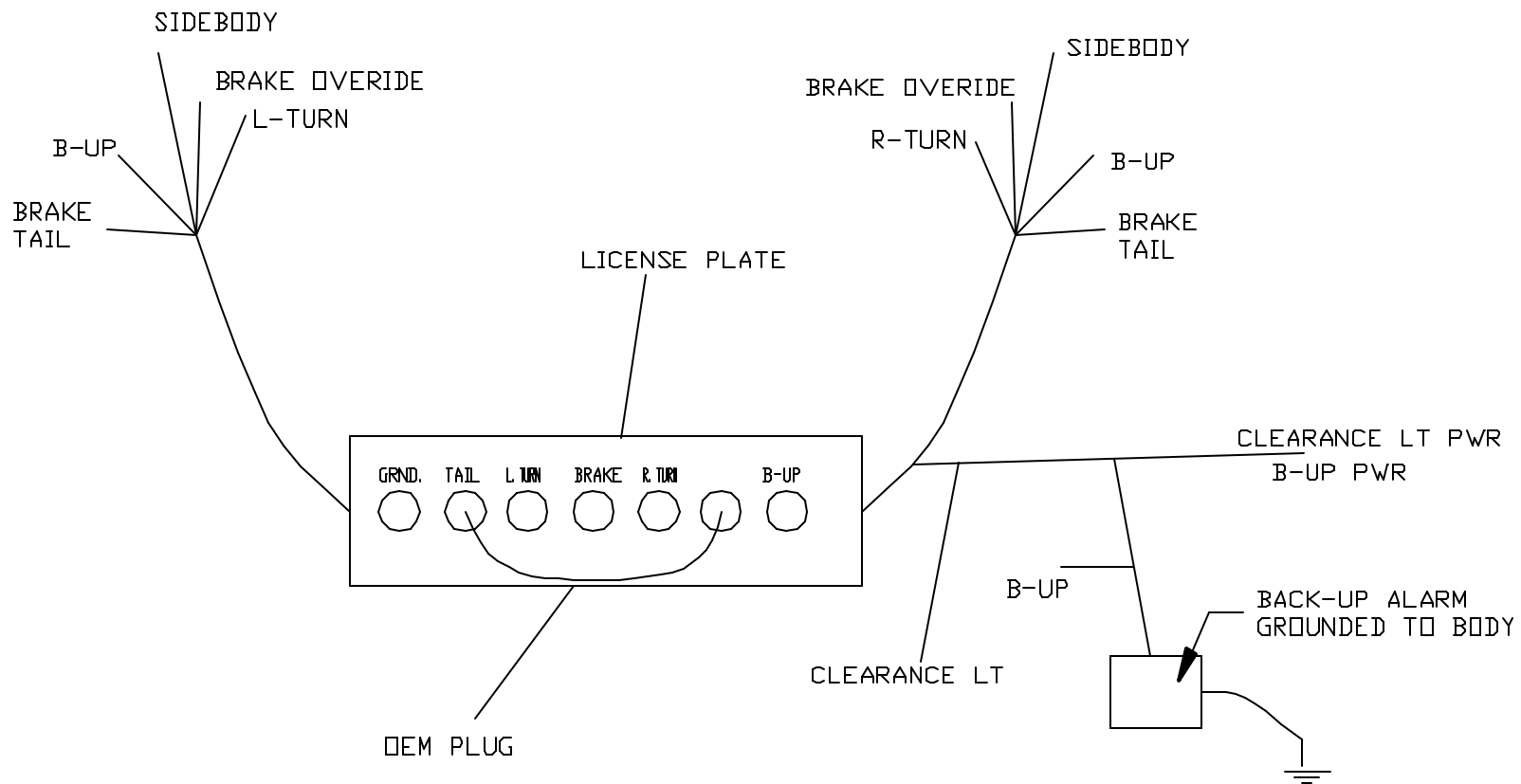
SCALE: Fit	APPROVED BY:	DRAWN BY: R/W/B
DATE: 9/9/99	Herman Mullet	REVISED
PART NAME: Engine Compartment Wire Harness		
		DRAWING NUMBER 7-6.DWG



1. Circuit Board
2. Rear Switch Panel
3. To Inverter and Battery Switch
4. To Front Console
5. To Heat Solenoid and ground
6. Start, Brake Light, Batt. Pwr for Radio
7. Intersection Lights
8. Siren Speakers and Bump Flasher
9. Horn & Fog Lights
10. Head Light Flasher
11. To computer, Backup Alarm, Hourmeter, Throttle, N/S
12. Air Conditioner
13. Ign. Solenoid, Radio Speakers, and Instrument Lights

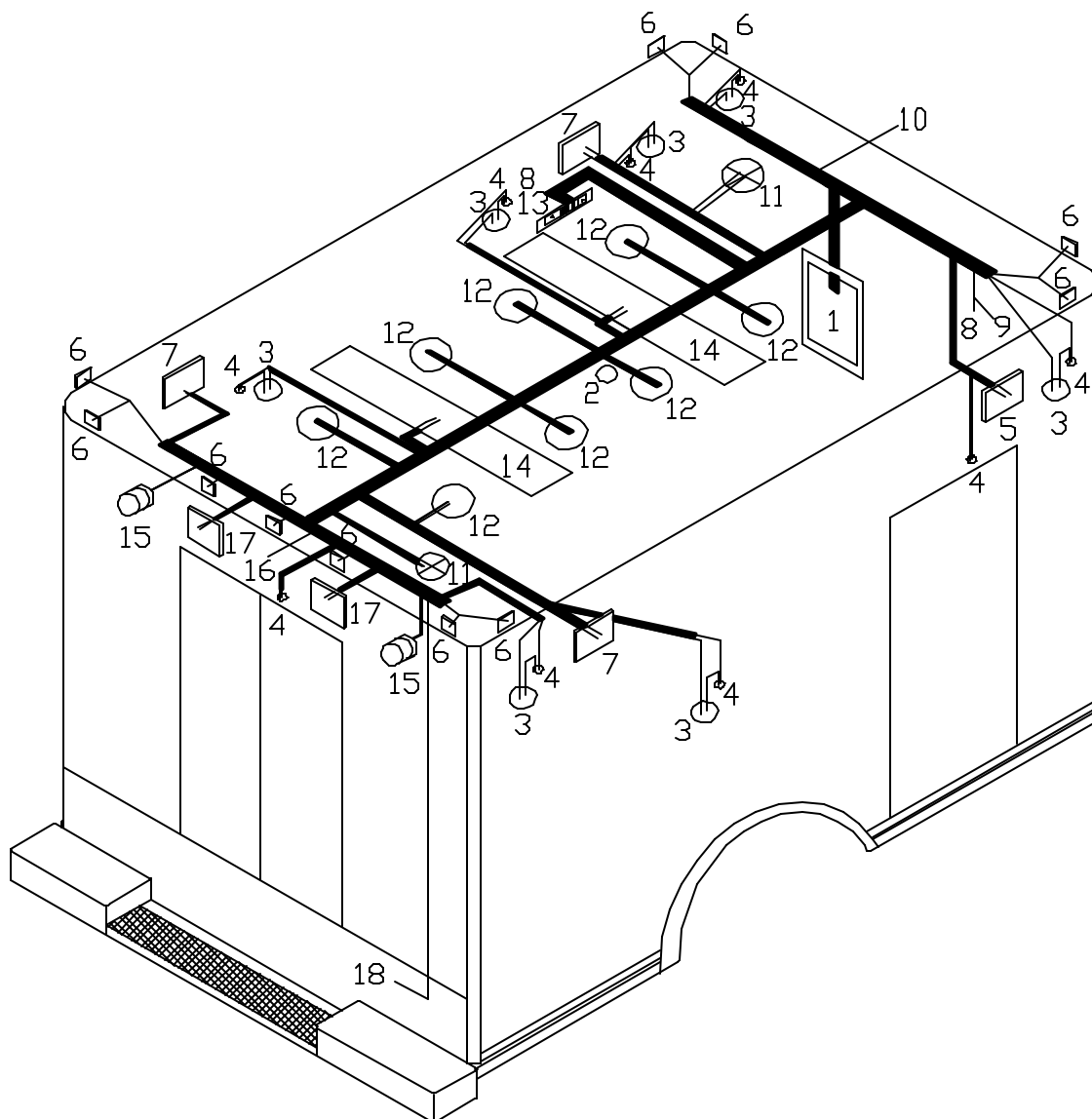
MEDTEC
A PIERCE COMPANY

SCALE: F11	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/19/01		REVISED:
PART NAME: E SERIES ENGINE HARNESS ROUTING		
	DRAWING NUMBER: 7-7	



MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 11/12/03		REVISED:
PART NAME: REAR TAIL LIGHT BOX		
		DRAWING NUMBER: 7-8

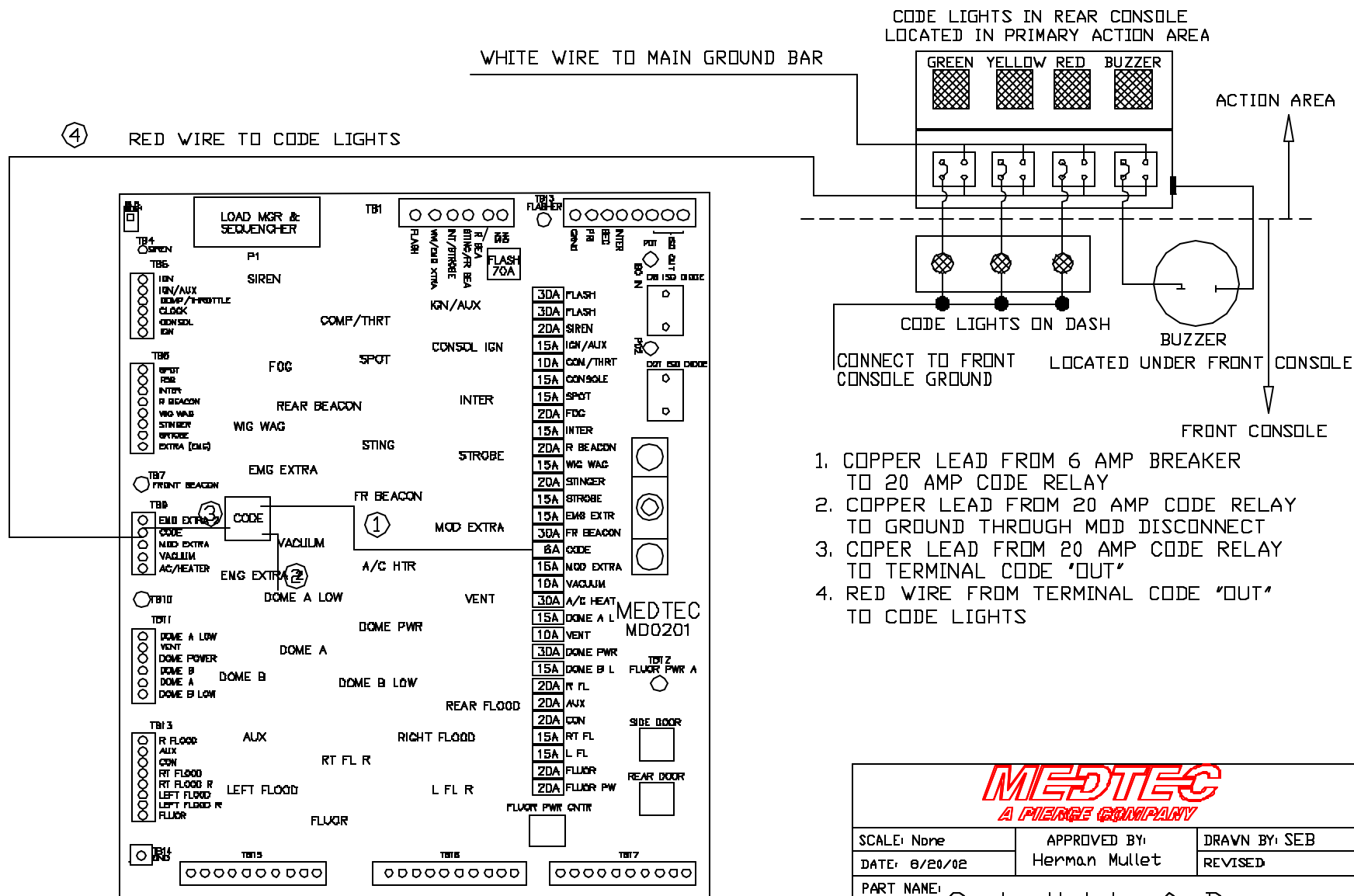


1. Circuit Board
2. Rear Flood Rectifier Splice to 98 + older
3. Compartment Light
4. Door Switch
5. Curbside Flood Light
6. Clearance Light
7. Roadside Flood Light
8. Medical Outlet Power
9. Air Conditioner
10. Front Lightbar
11. Speaker
12. Dome Light
13. Rear Switch Panel
14. Fluorescent Light
15. Exhaust Fan
16. Rear Lightbar
17. Rear Flood Light
18. Backup Alarm

MEDTEC
A PERGE COMPANY

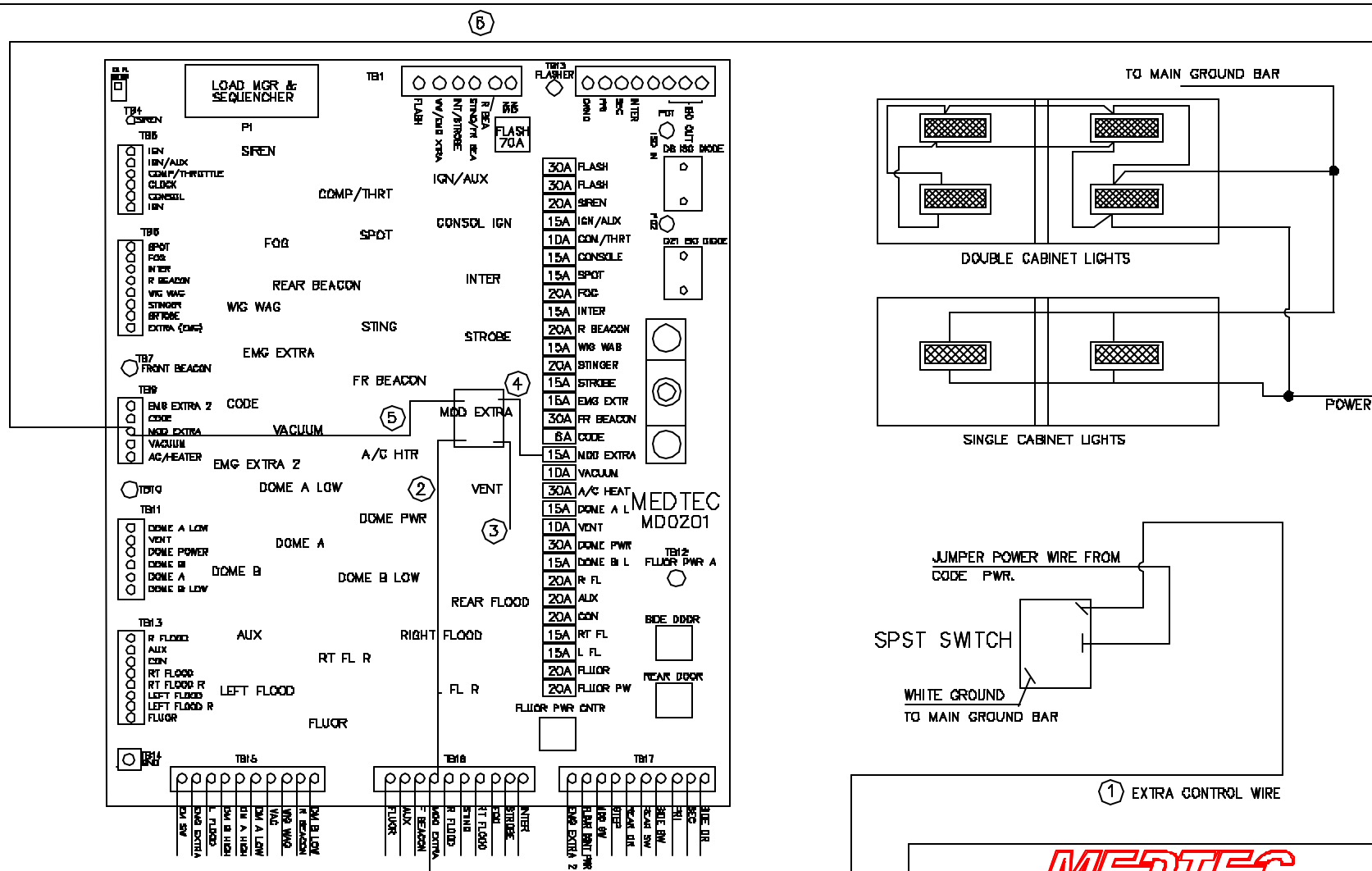
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: Mod Main Harness		
		DRAWING NUMBER: 8-1.DWG

8-2



MEDTEC A PIERRE COMPANY		
SCALE: None	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED
PART NAME: Code lights & Buzzer		
MD0201		DRAWING NUMBER: 8-2.DWG

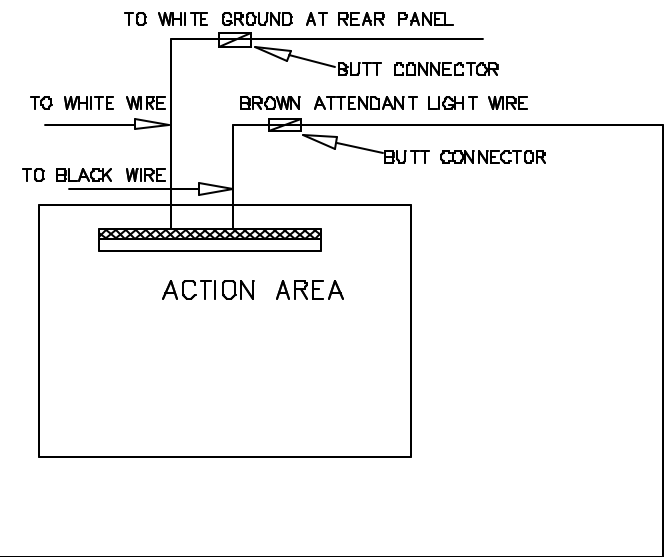
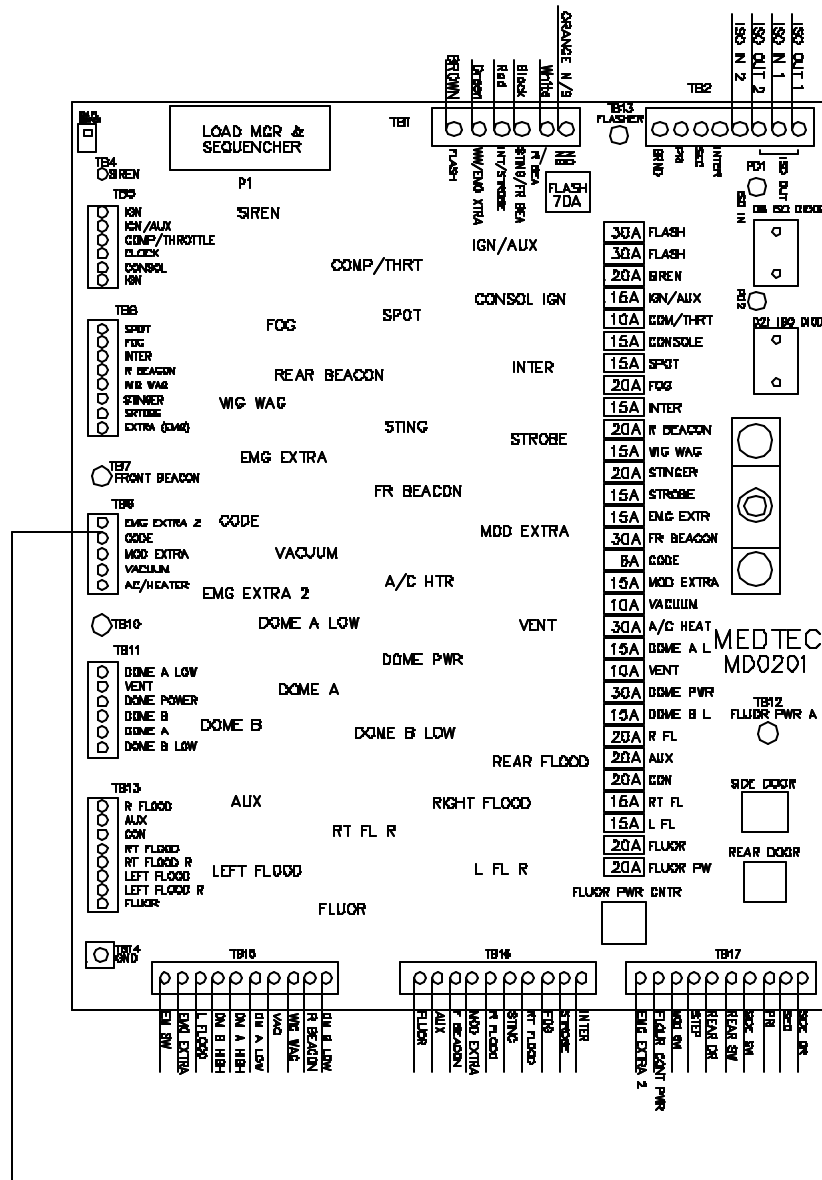
8-3



1. EXTRA CONTROL WIRE FROM SPST SWITCH TO TERMINAL EXTRA "IN"
2. COPPER LEAD FROM TERMINAL EXTRA "IN" TO 20 AMP EXTRA RELAY
3. COPPER LEAD FROM 20 AMP EXTRA RELAY TO GROUND THROUGH MOD DISCONNECT
4. COPPER LEAD FROM 15 AMP EXTRA BREAKER TO 20 AMP EXTRA RELAY
5. COPPER LEAD FROM 20 AMP EXTRA RELAY TO TERMINAL EXTRA "OUT"
6. WIRE FROM TERMINAL EXTRA "OUT" TO POWER LIGHTS

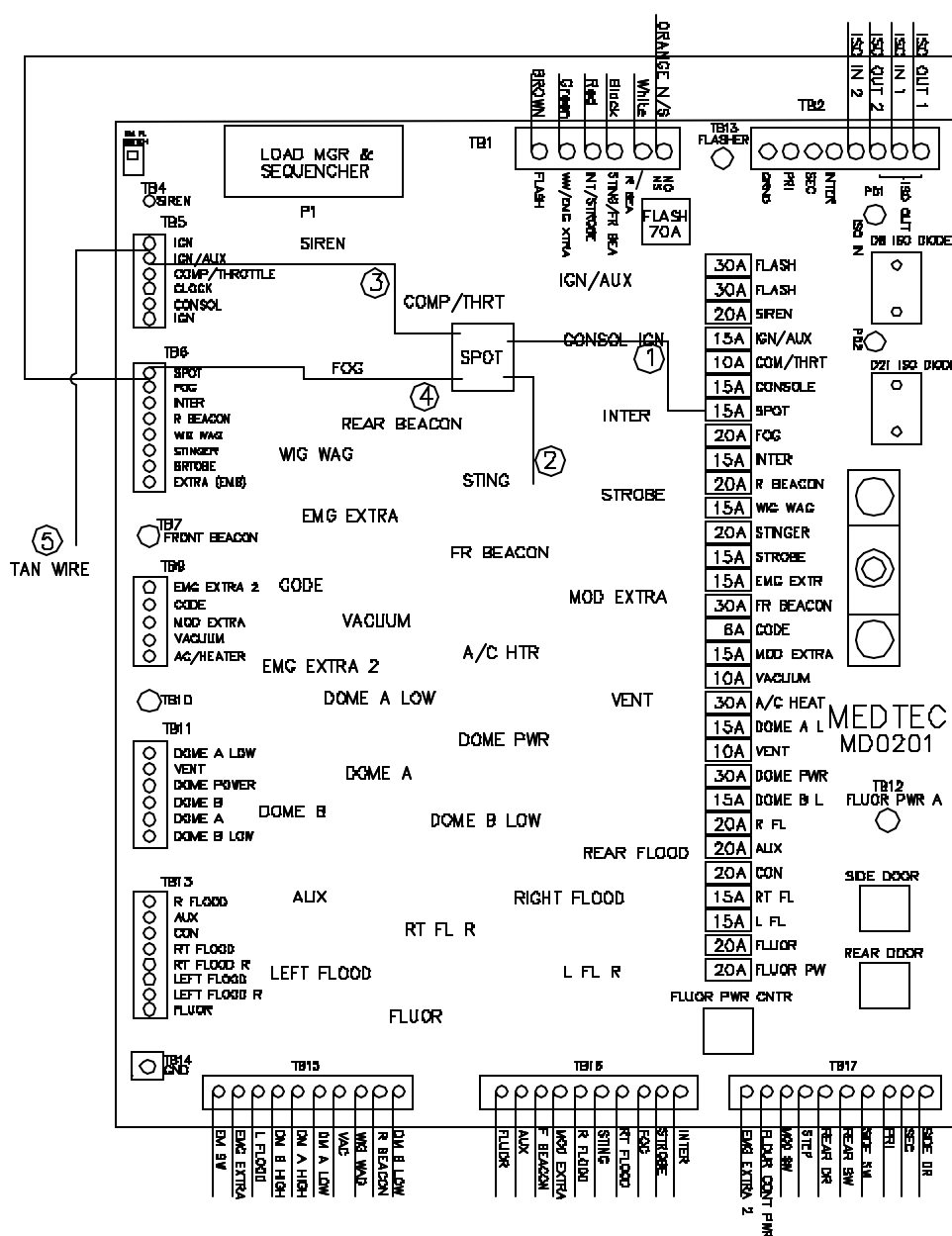
MEDTEC
A PULSAR COMPANY

SCALE: 1/4"	APPROVED BY:	DRAWN BY: SEB
DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME: Lighted Cabinets		
MD0201		DRAWING NUMBER: 8-3.DWG

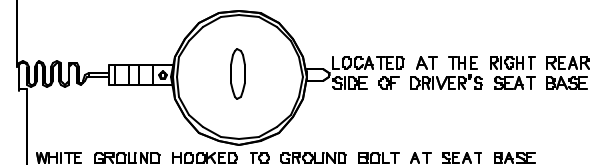


MEDTEC A PIERCE COMPANY		
SCALE: 1/4"	APPROVED BY:	DRAWN BY: SEB
DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME: 18 Inch Attendant Light In Action Area		
MD0201		DRAWING NUMBER: 8-4.DWG

8-5



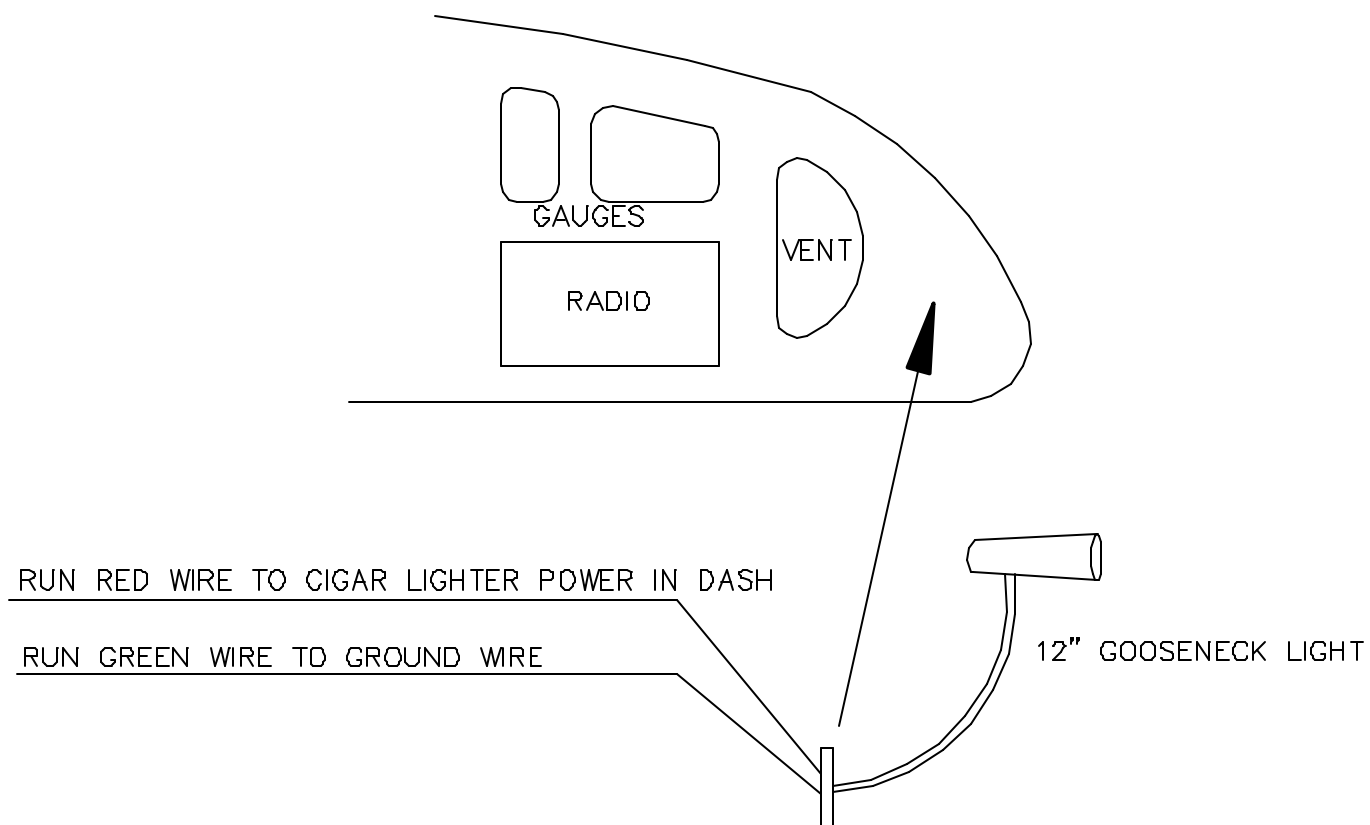
HANDHELD SPOTLIGHT



1. COPPER LEAD FROM 15 AMP BREAKER TO 20 AMP SPOT RELAY
2. COPPER LEAD FROM 20 AMP SPOT RELAY TO GROUND THROUGH EMERGENCY SWITCH
3. COPPER LEAD FROM 20 AMP SPOT RELAY TO TERMINAL IGN "OUT"
4. COPPER LEAD FROM 20 AMP SPOT RELAY TO TERMINAL SPOT "OUT"
5. TAN WIRE FROM TERMINAL IGN TO OEM IGNITION
6. BROWN WIRE FROM TERMINAL SPOT "OUT" TO SPOTLIGHT

MEDTEC
A PYRENE COMPANY

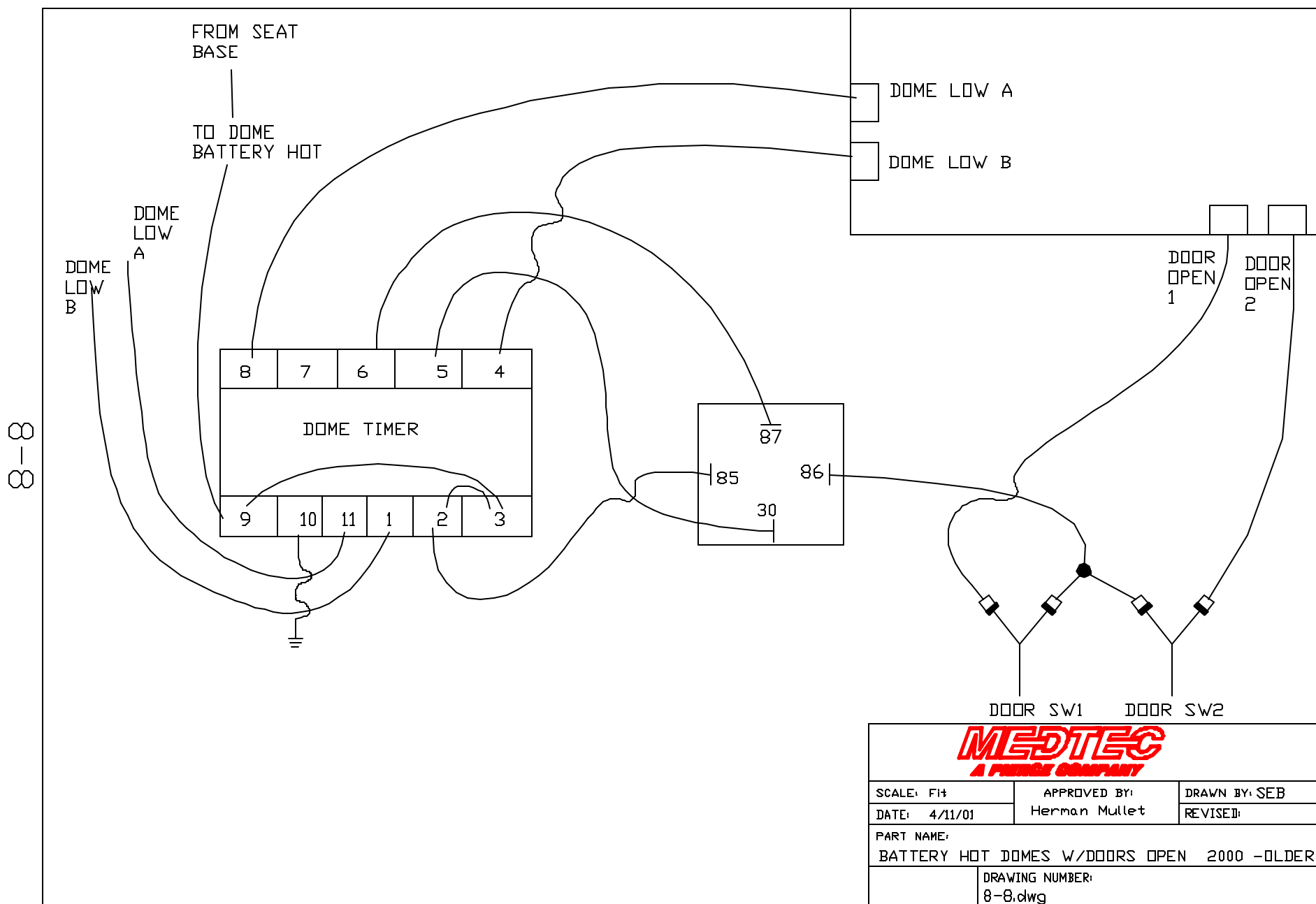
SCALE: 1" = 1'	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED:
PART NAME: Hand-held Spotlight		
MD0201		DRAWING NUMBER: 8-5.DWG

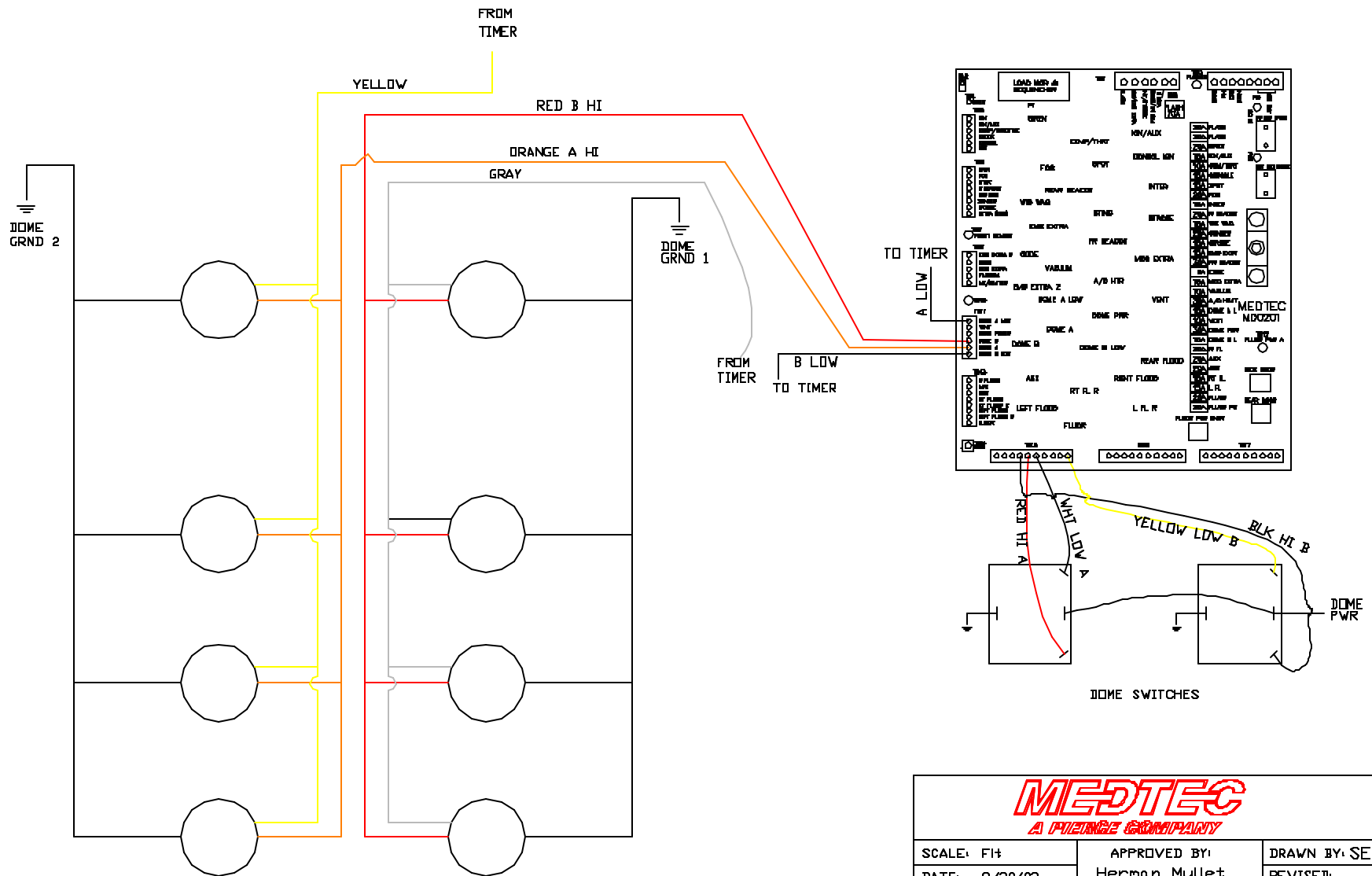


ABOVE FRONT SWITCH PANEL
LOCATED ON DASH

MEDTEC
A PIERCE COMPANY

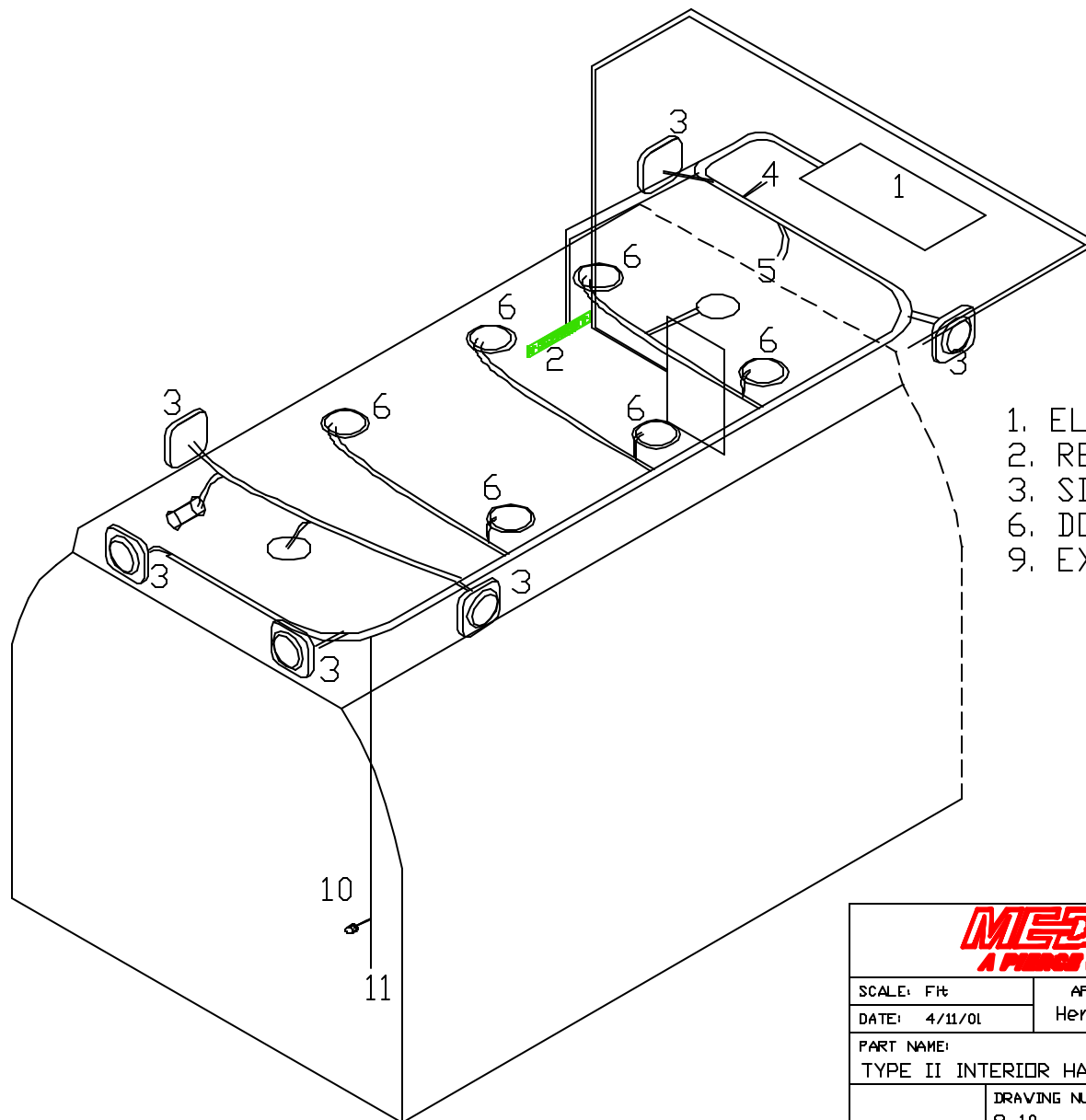
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: Gooseneck Light Mounted on the Dash Console		
		DRAWING NUMBER: 8-6.DWG





MEDTEC
A PIERCE COMPANY

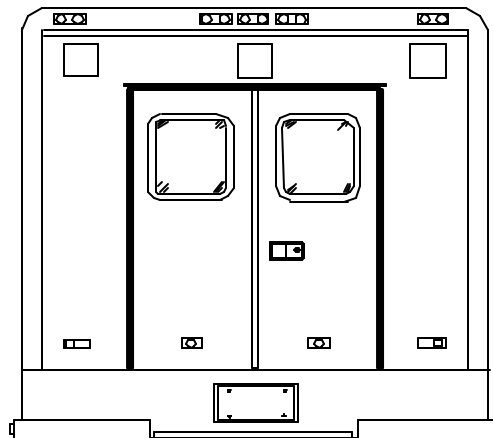
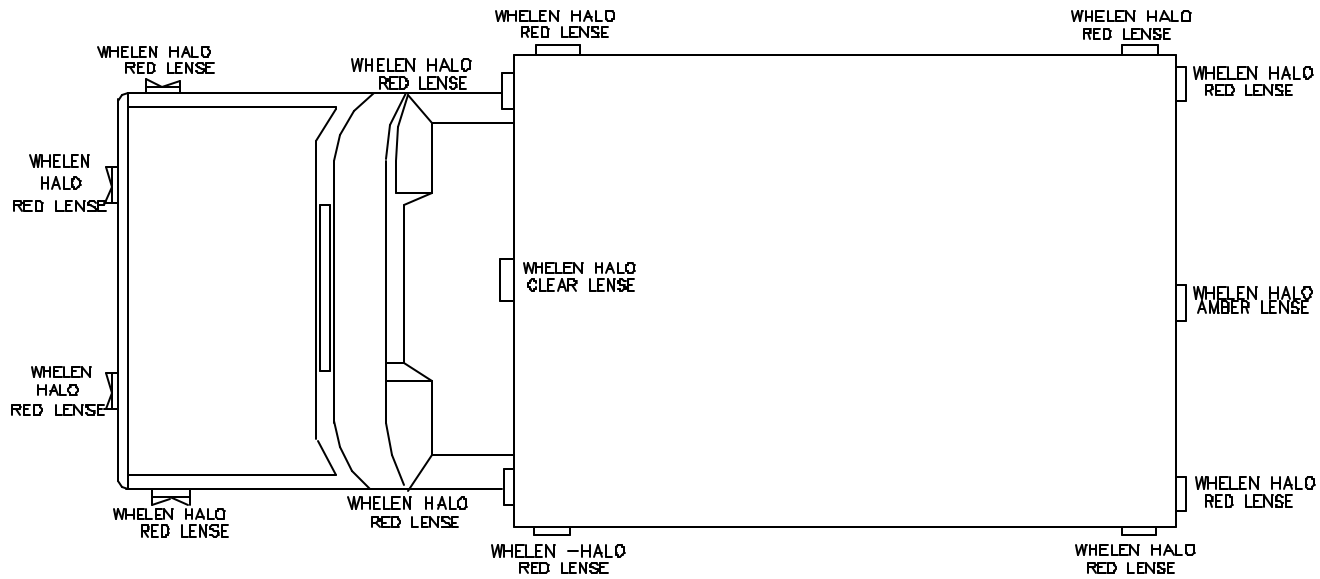
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME:		
DOME LIGHTS SWITCHING		
MD0201		DRAWING NUMBER:
		8-9.DWG



- 1. ELE. PC BOARD
- 2. REAR SWITCH PANEL
- 3. SIDE SCENE LIGHTS
- 6. DOME LIGHTS
- 9. EXHAUST VENT

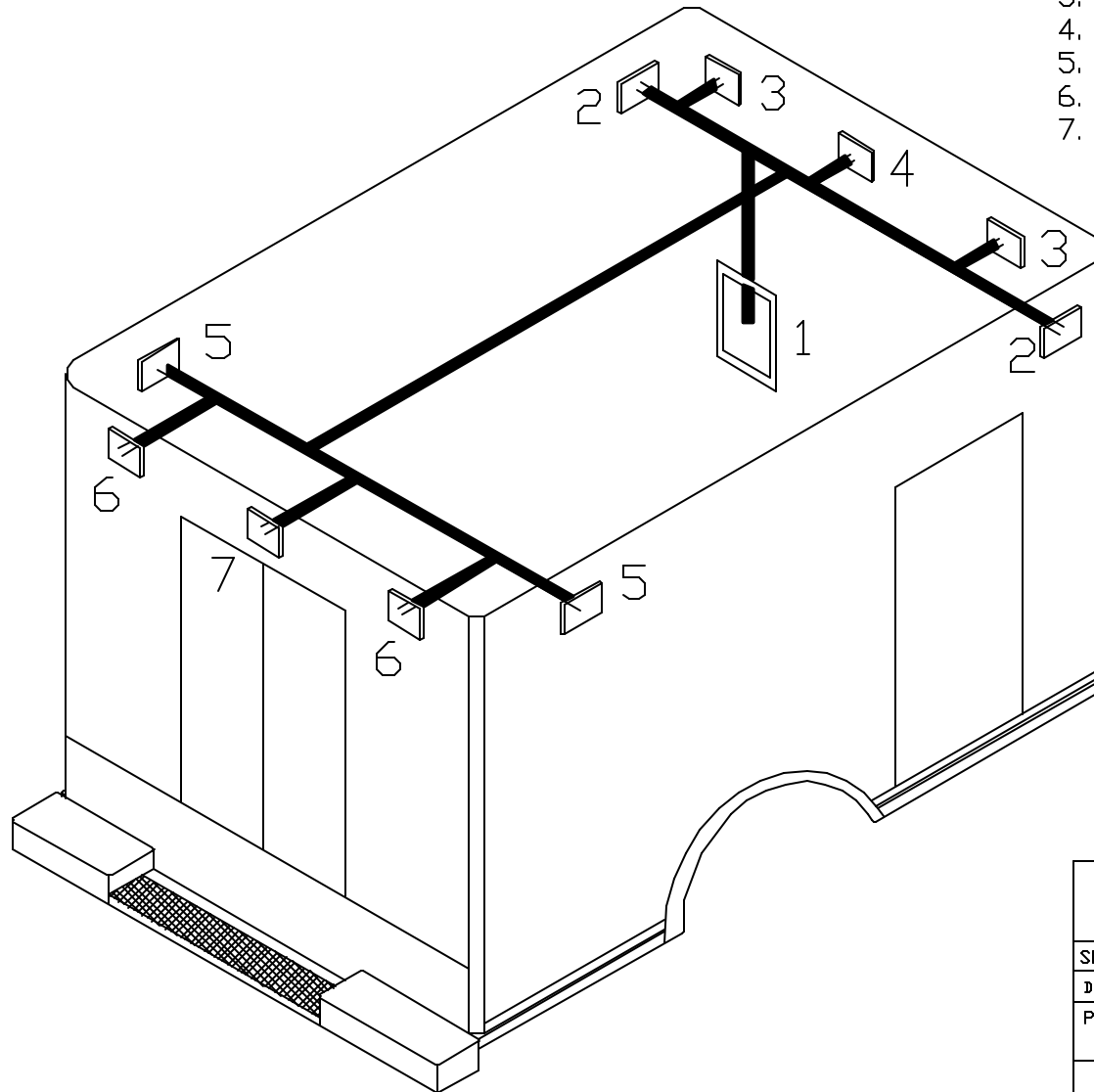
MEDTEC
A PIERCE COMPANY

SCALE: F11	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/11/01		REVISED:
PART NAME: TYPE II INTERIOR HARNESS		
	DRAWING NUMBER: 8-10	



MEDTEC™		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/27/03		REVISED:
PART NAME: E-Spec Lighting		
		DRAWING NUMBER: 9-1.DWG

9-2



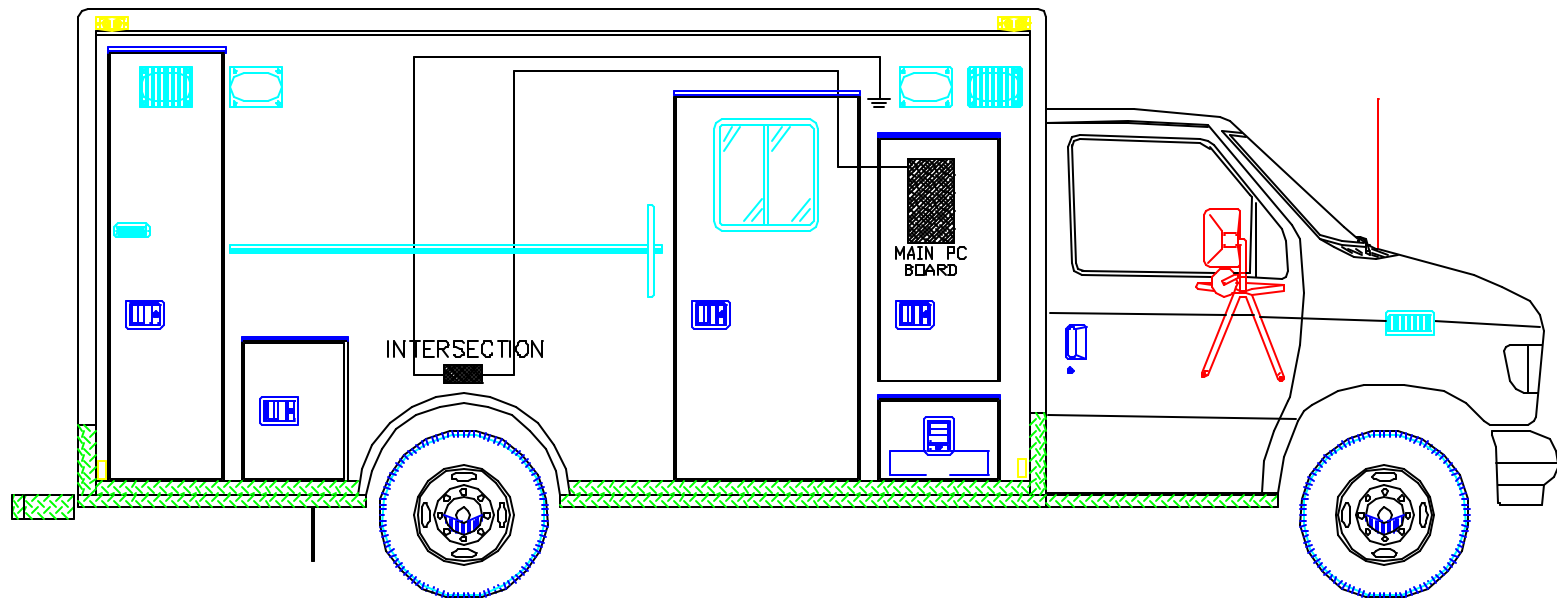
1. Circuit Board
2. Yellow & Ground 1
3. Yellow, Extra Tan, & Ground 1
4. White Flash & Ground 1
5. Red & Ground 2
6. Red, Extra Orange, & Ground 2
7. Yellow 1 & Ground 1

MEDTEC
A PERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/18/99		REVISED:
PART NAME: Mod Flasher Harness		
		DRAWING NUMBER: 9-2.DWG

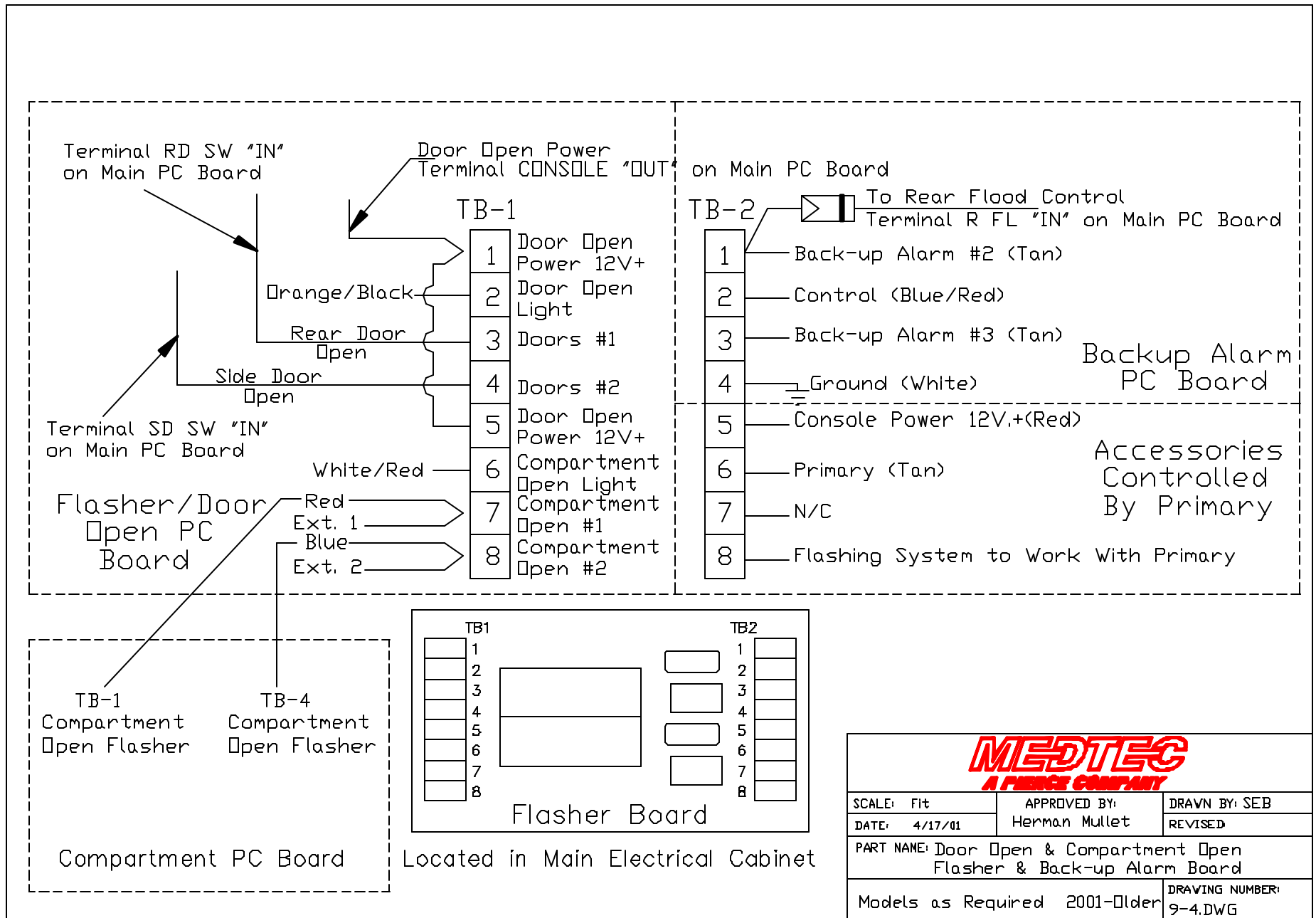
OPTION #1
HOOK SIDE EMERGENCY LIGHT TO
INTERSECTION ON PC BOARD

STD.
HOOK SIDE EMERGENCY LIGHT TO
C POST ON FLASHER

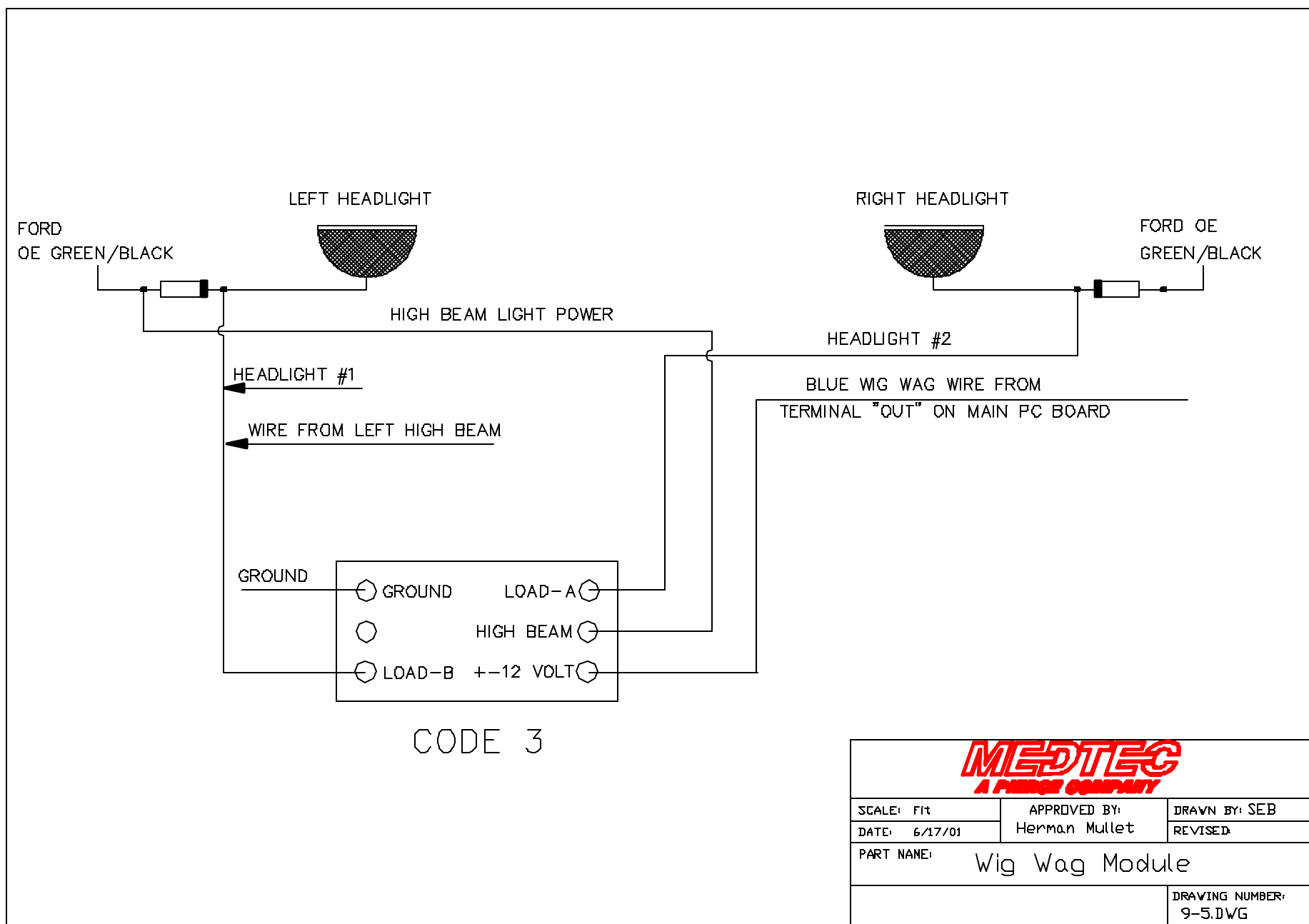


MEDTEC
A PIERCE COMPANY

SCALE: 1/4" = 1'	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/18/99		REVISED:
PART NAME: Side Warning Light Option		
		DRAWING NUMBER: 9-3.DWG

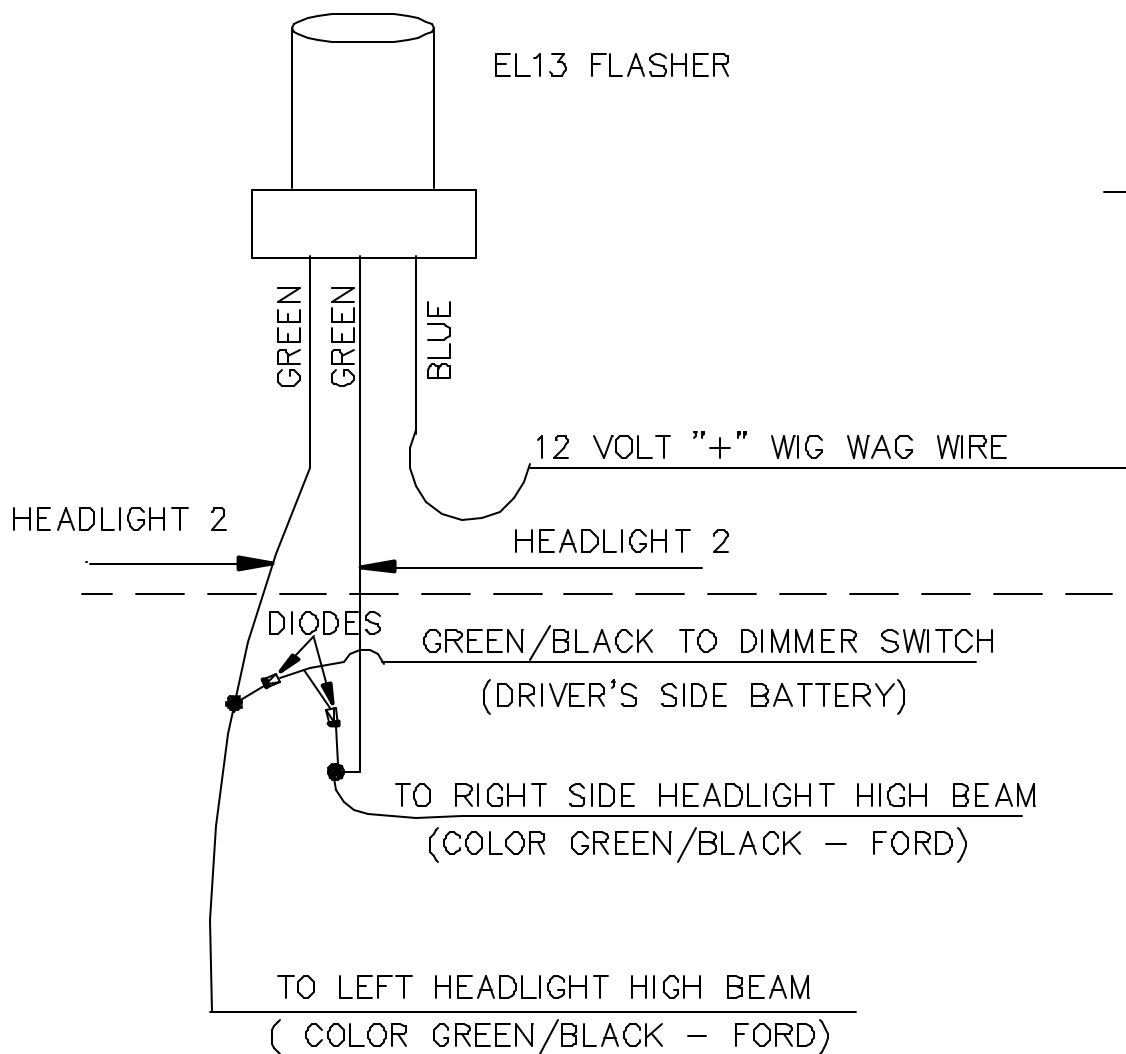


9-5



MEDTEC A PIERCE COMPANY		
SCALE: 1:1	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 6/17/01		REVISED:
PART NAME:	Wig Wag Module	
	DRAWING NUMBER: 9-5.DWG	

9-6



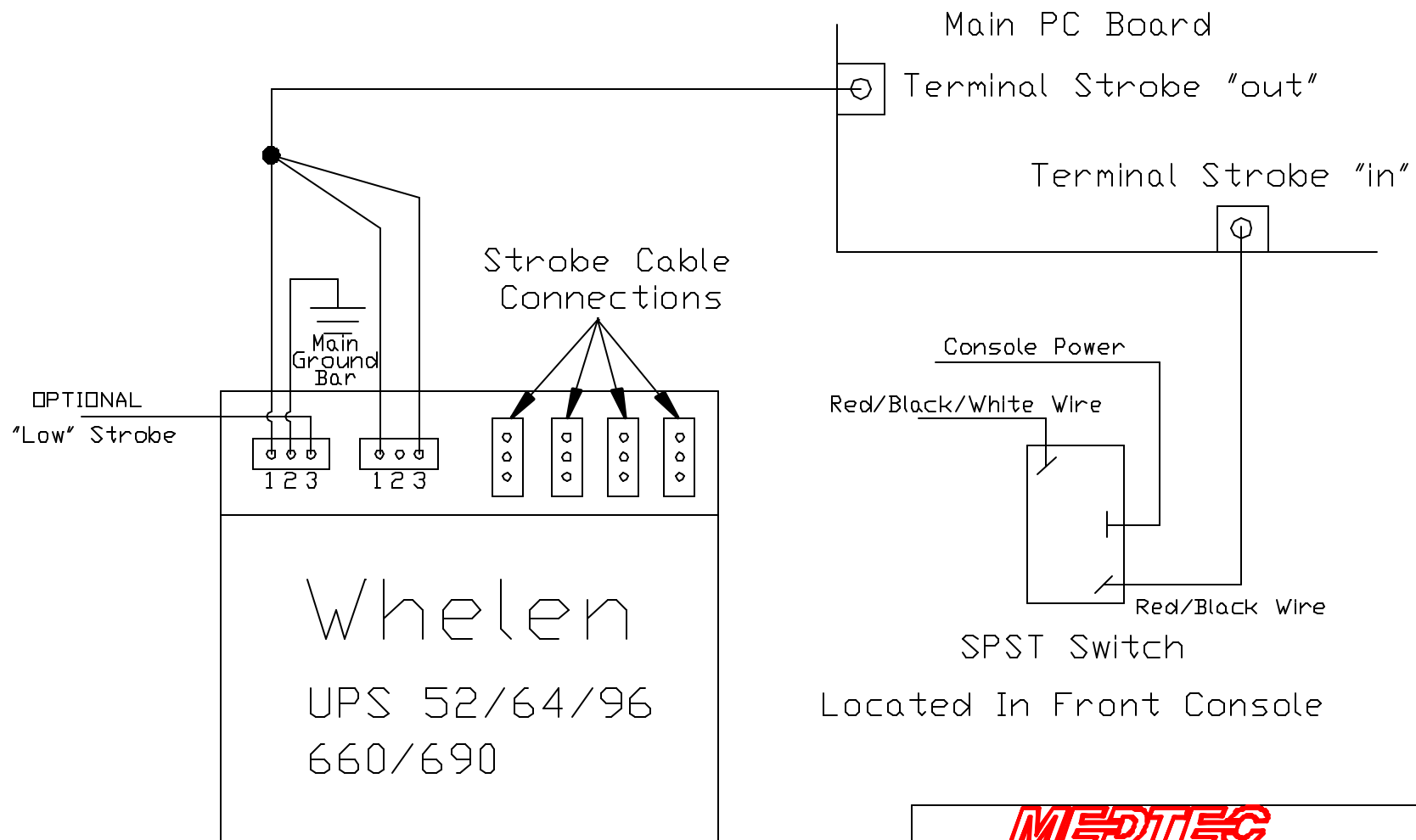
IN ELECTRIC CABINET

TO WIG WAG LEFT
SIDE ELECTRIC PANEL

UNDER THE HOOD

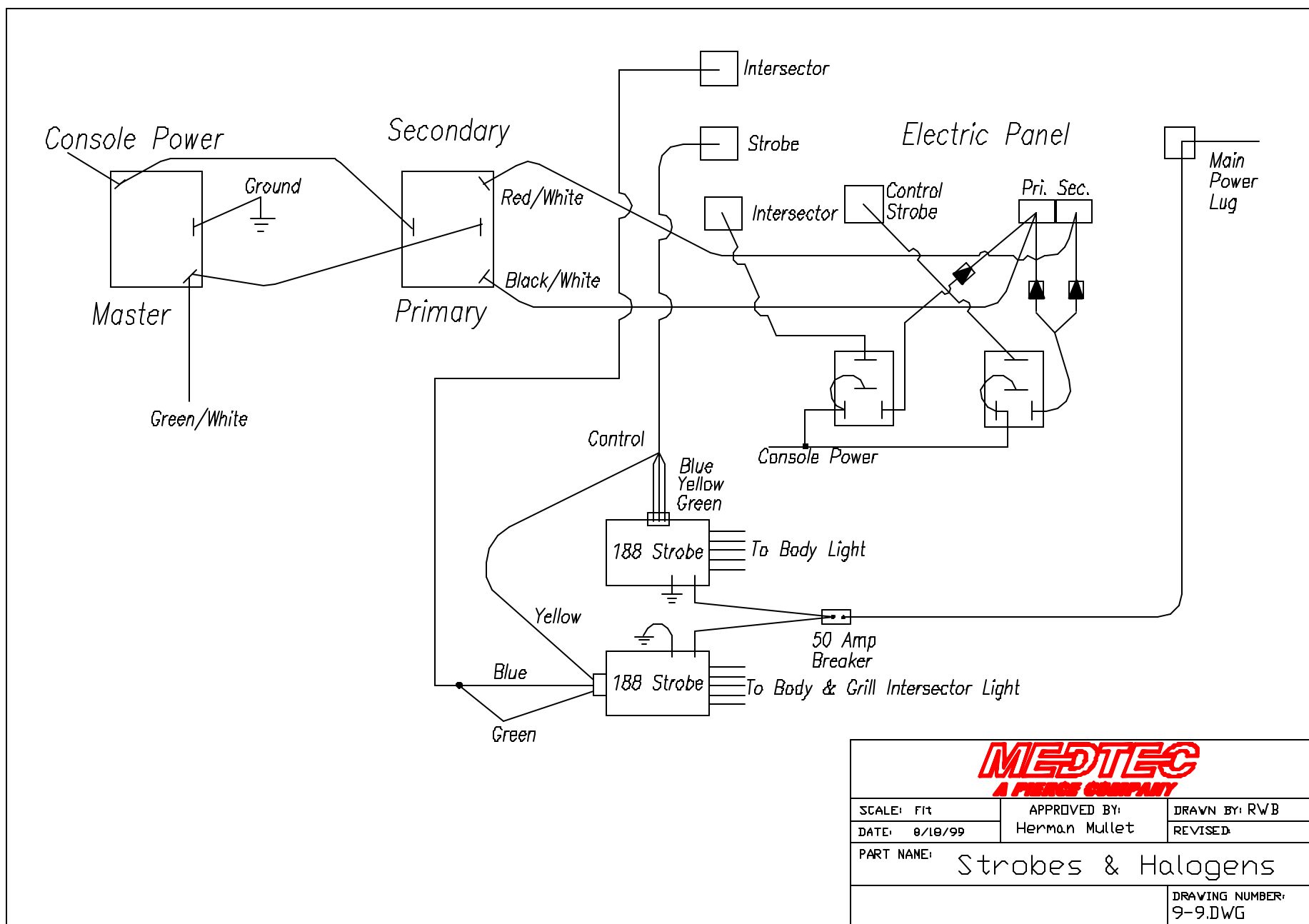
MEDTEC
A FERRIS COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/18/99		REVISED:
PART NAME: Wlg Wag With EL13 Flasher		
		DRAWING NUMBER: 9-6.DWG

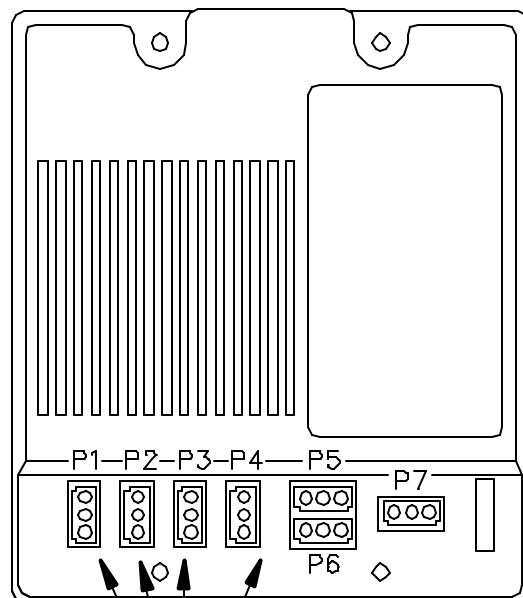


MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Whelen UPS-52/64/96 Strobe Pack		
Through 1996		DRAWING NUMBER: 9-8.DWG

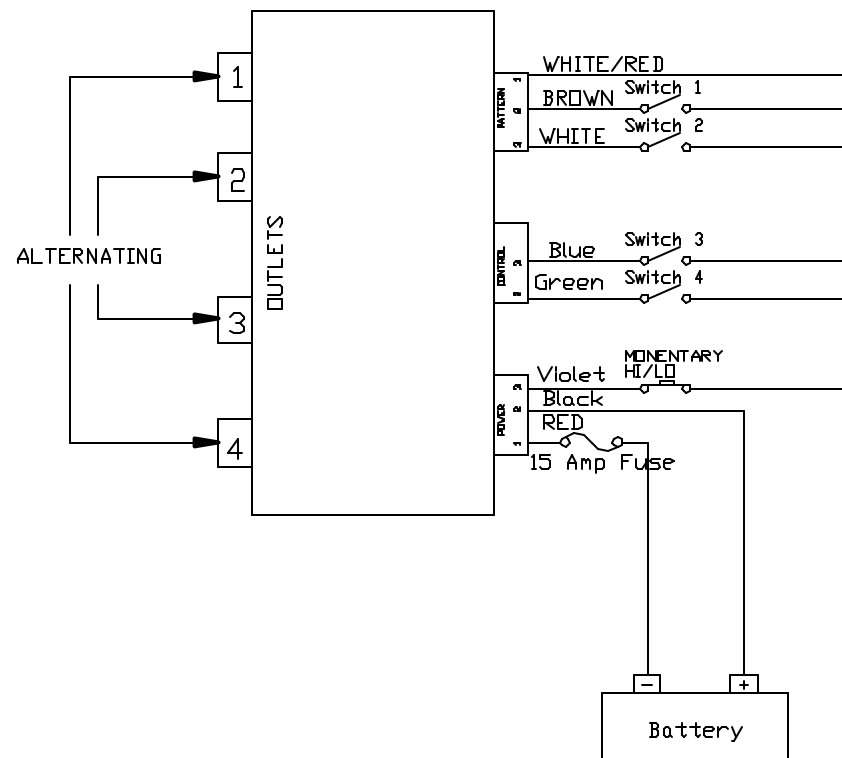
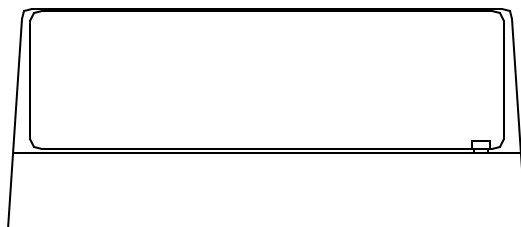


MEDTEC A PIERCE COMPANY		
SCALE: 1/16"	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/18/99		REVISED:
PART NAME:	Strokes & Halogens	
		DRAWING NUMBER: 9-9.DWG



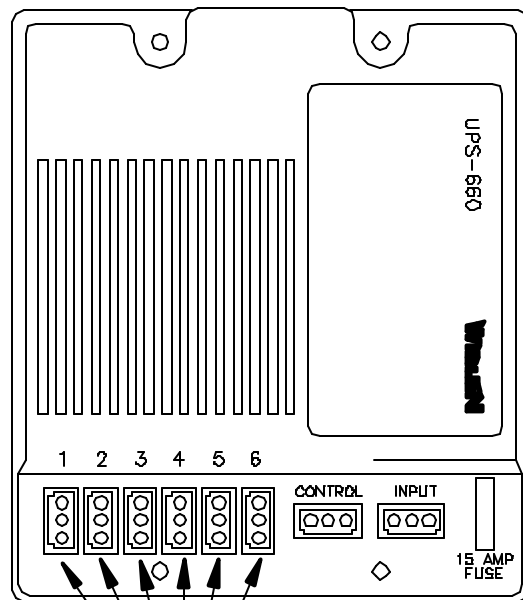
Stroke Outlets

OUTLET 1&4 = FLASH ALTERNATELY
 OUTLET 2&3 = FLASH ALTERNATELY
 OUTLET 1&3 = FLASH SIMULTANEOUSLY
 OUTLET 2&4 = FLASH SIMULTANEOUSLY

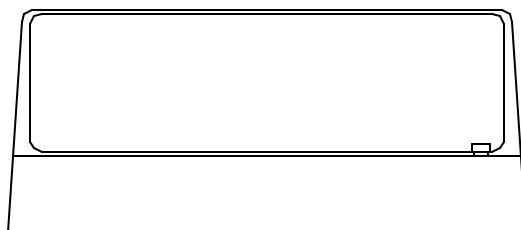


MEDTEC
A PIERCE COMPANY

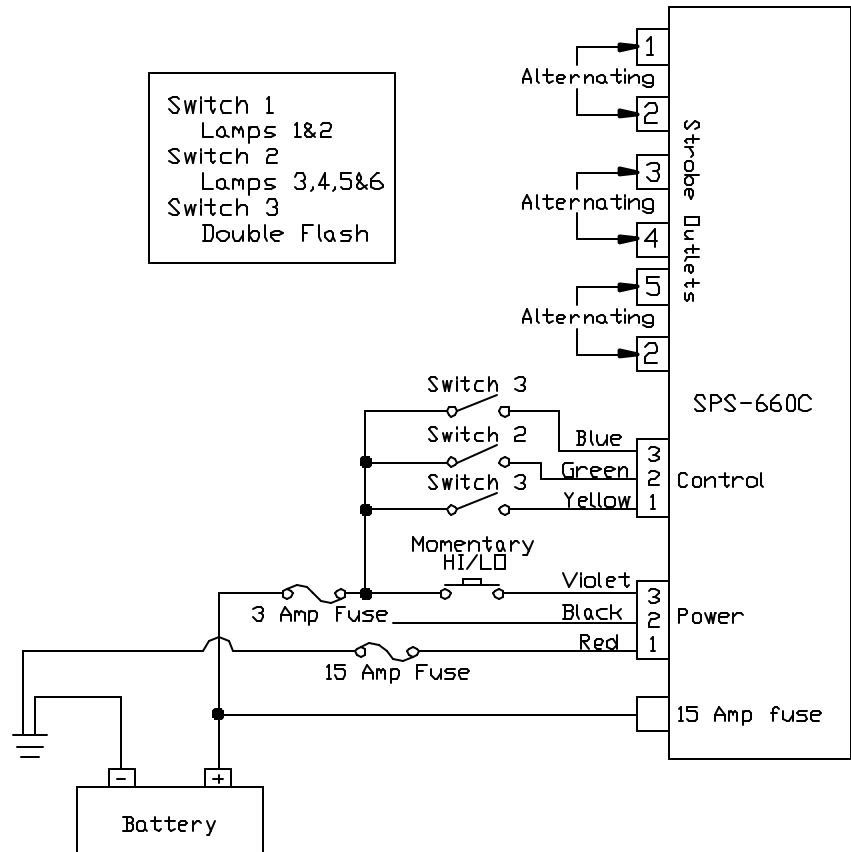
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Rodney Burnham	REVISED:
PART NAME: Whelen UPS 64LX Power Supply		
		DRAWING NUMBER: 9-10.DWG



Stroke Outlets

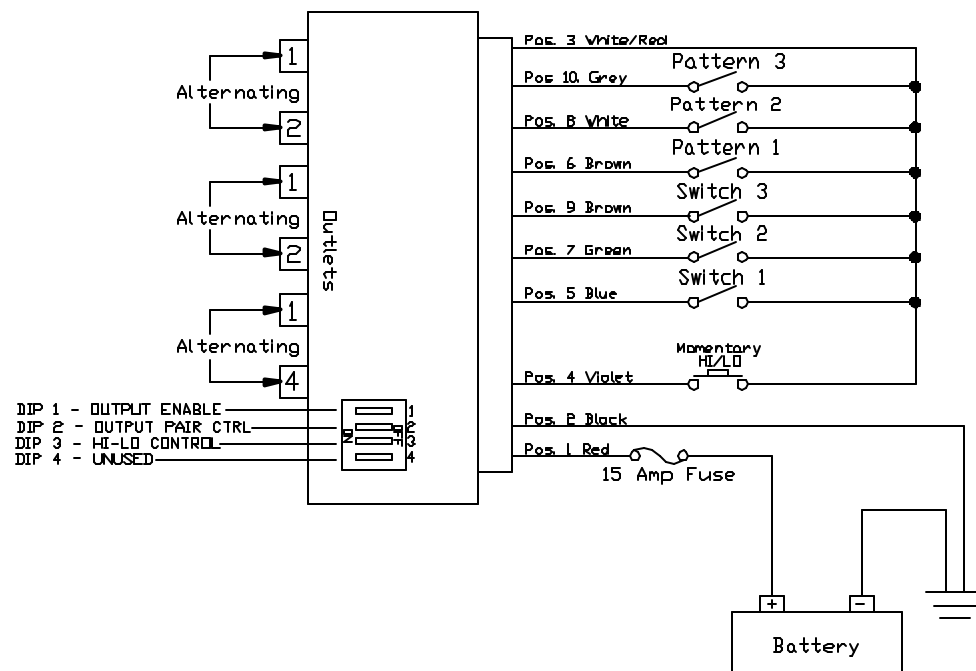
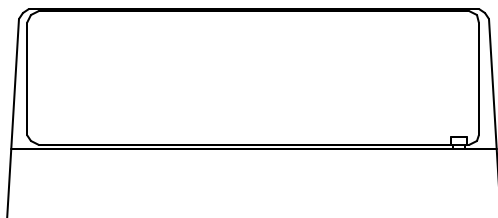
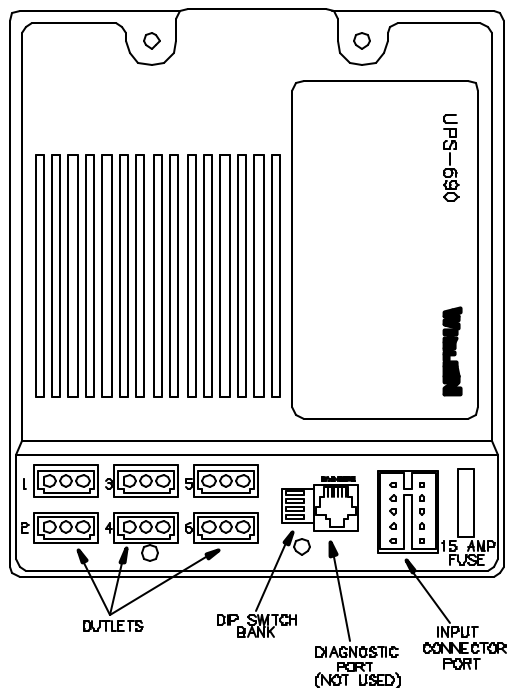


Switch 1
Lamps 1&2
Switch 2
Lamps 3,4,5&6
Switch 3
Double Flash

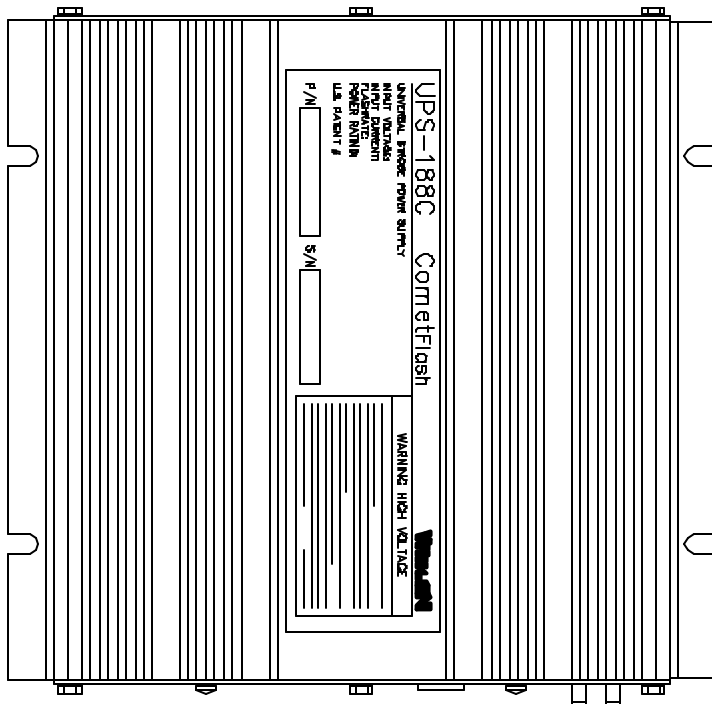


MEDTEC
A PIERCE COMPANY

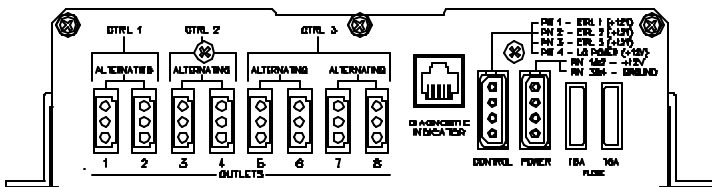
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Rodney Burnham	REVISED:
PART NAME: Whelen UPS 660 Power Supply		
		DRAWING NUMBER: 9-11.DWG



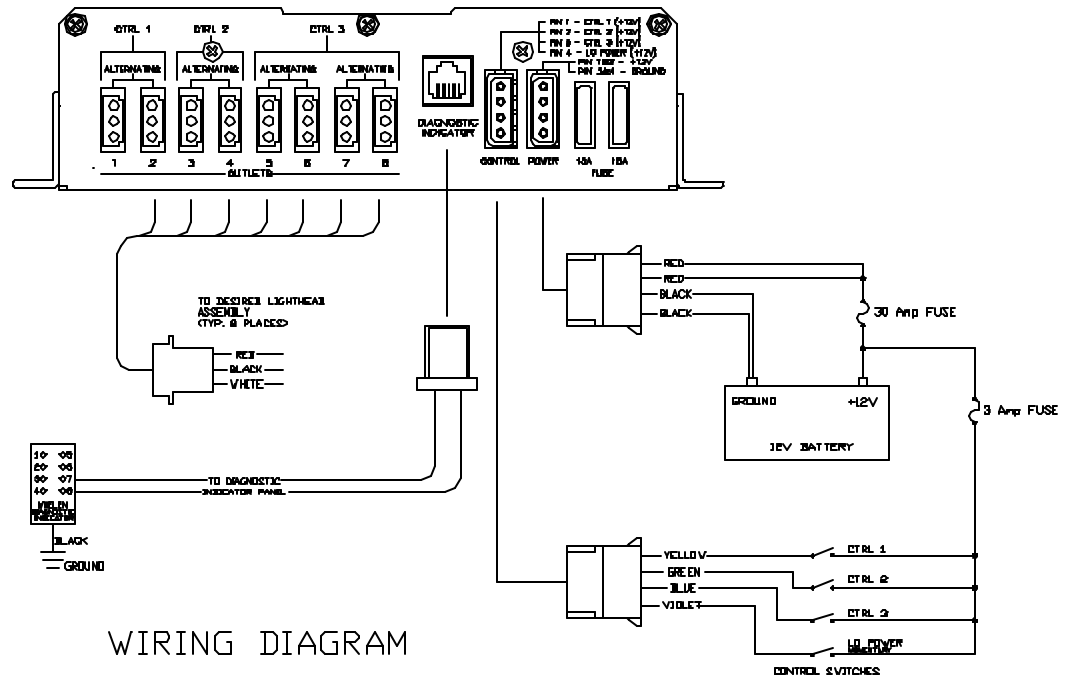
MEDTEC A FERRIS COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Rodney Burnham	REVISED:
PART NAME: Whelen UPS 690 Power Supply		
		DRAWING NUMBER: 9-12.DWG



TOP VIEW



FRONT VIEW

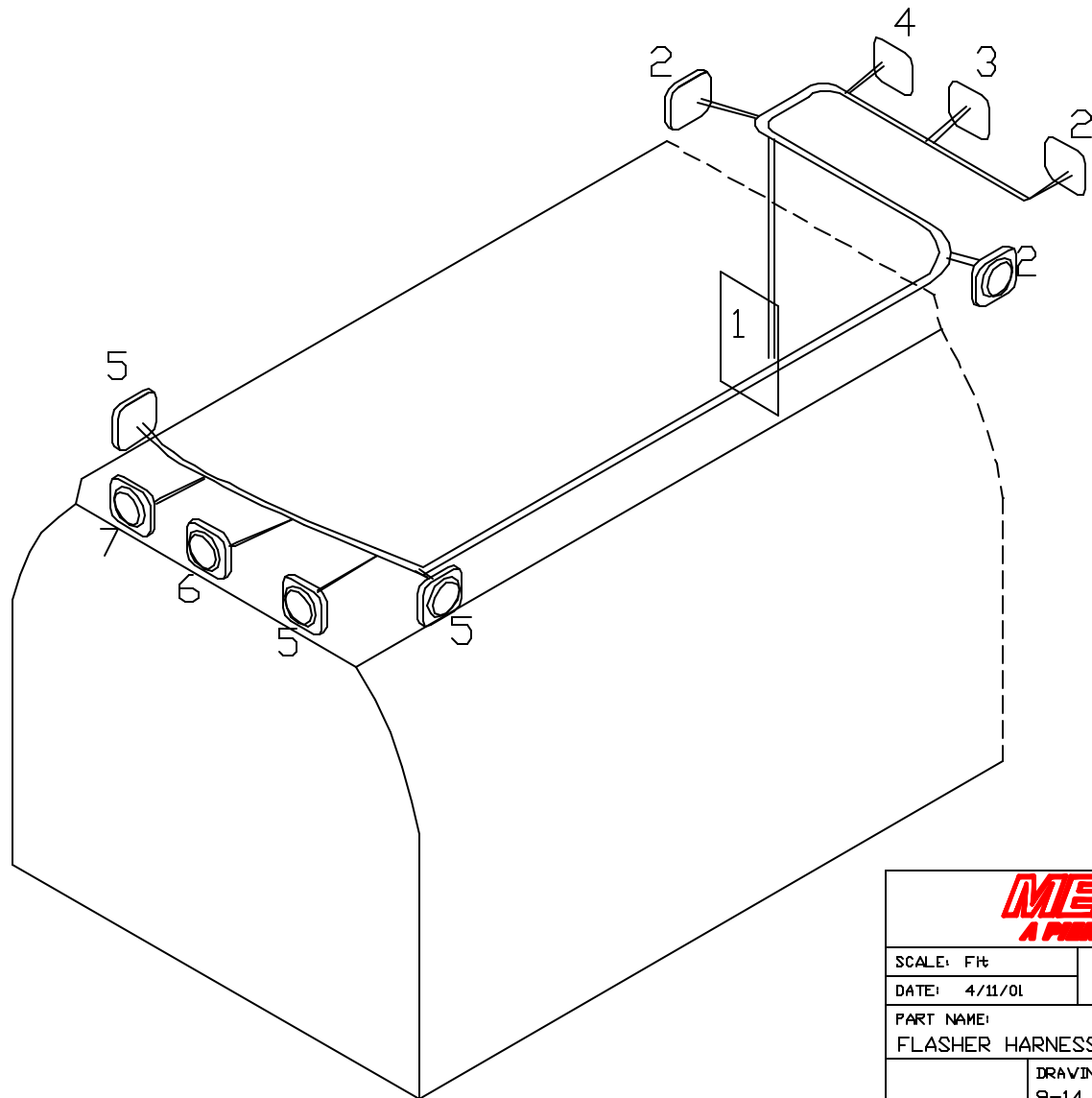


WIRING DIAGRAM

MEDTEC
A PERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Rodney Burnham	REVISED:
PART NAME: Whelen UPS188C Power Supply		
		DRAWING NUMBER:
		9-13.DWG

9-14



- 1. ELECTRICAL PC BOARD
- 2. CLEAR WARNIG LIGHT
- 3. CLEAR WARNIG LIGHT
- 4. CLEAR WARNIG LIGHT
- 5. REAR SCENE LIGHTS
- 6. AMBER WARNING LIGHT
- 7. AMBER WARNING LIGHT

MEDTEC
A PIERCE COMPANY

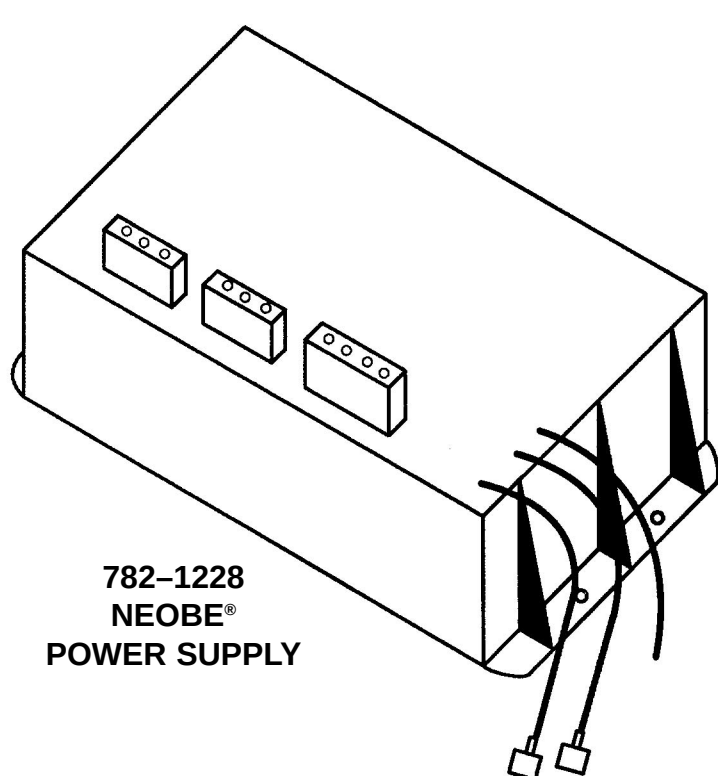
SCALE: F11	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/11/01		REVISED:
PART NAME: FLASHER HARNESS		
	DRAWING NUMBER: 9-14	

NEOBE® POWER SUPPLY

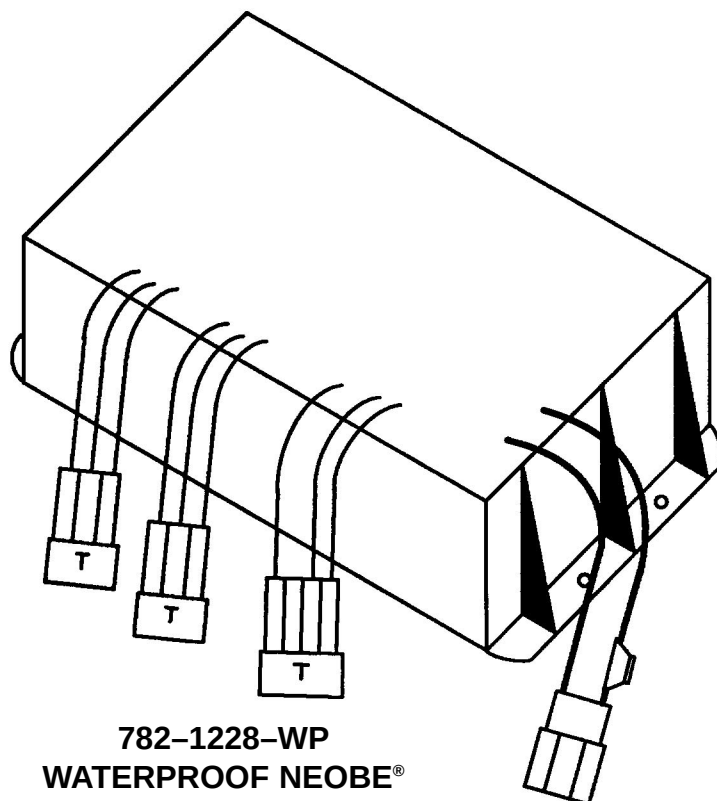
Models: 782-1228

782-1228-WP

Instruction Manual



782-1228
NEOBE®
POWER SUPPLY



782-1228-WP
WATERPROOF NEOBE®
POWER SUPPLY



TOMAR Electronics, Inc.

2100 West Obispo Avenue

Gilbert, Arizona 85233 USA

(602) 497-4400 • (800) 338-3133

FAX (602) 497-4416 • (800) 688-6627

www.tomar.com

E-mail sales@tomar.com

SAFETY NOTICES WARNING

Failure to follow all safety precautions and instructions may result in property damage, serious injury or death to you or others.

SAFETY MESSAGE TO INSTALLERS, USERS AND MAINTENANCE PERSONNEL

It is important to follow all instructions shipped with this product. This power supply is to be installed by a trained installer who is thoroughly familiar with electrical wiring techniques, including manufacturer's guidelines for mobile vehicular applications, the national electrical code and local codes.

This power supply generates 600 Volts. NEVER work on this power supply or lighting system before removing input power. WAIT 10 MINUTES AFTER REMOVING INPUT POWER BEFORE ATTEMPTING ANY SERVICE ON THIS SYSTEM.

The selection of the mounting location for the device, its controls and the routing of the wiring is to be accomplished under the direction of the engineer in charge.

The 782–1228 weighs approximately 2.5 pounds. For mobile vehicular applications, the installer must find a safe mounting location so that in the event of an accident the power supply cannot become loose within the passenger compartment of the vehicle and potentially cause impact to a passenger.

Listed below are other important safety instructions and precautions:

- Read and understand all instructions before beginning any installation.
- DO NOT connect power to this device before completing installation. If installing in a vehicle, disconnect the battery of the vehicle before beginning installation.
- After installation, ensure that all mounting hardware is tightened, all electrical joints are tight and all connectors are properly seated.
- After installation and testing is complete, provide a copy of these instructions to all operating personnel.
- TEST THE SYSTEM REGULARLY TO ENSURE THAT IT IS OPERATING PROPERLY.

INSTALLATION

1. UNPACKING

After unpacking the power supply, examine it for damage that may have occurred in shipping. If the equipment has been damaged, do not attempt to install or operate it. File a claim immediately with the carrier stating the extent of the damage. Carefully check all envelopes, shipping labels and tags before removing or destroying them.

782-1228

<u>Quantity</u>	<u>Description</u>
1	782-1228 Power Supply
1	782-IKIT Installation Kit
	Consisting Of:
	1 BLACK Power Lead M897
	1 RED Power Lead M902
	1 Control Connector 782-CC
	1 Instruction Manual IS0053

782-1228-WP

<u>Quantity</u>	<u>Description</u>
1	782-1228-WP Waterproof Power Supply
1	782WP-IKIT Installation Kit
	Consisting Of:
	1 WP Power Connector WPPC-1
	1 WP Control Connector WPCC-1
	1 Instruction Manual IS0053

Carefully check the material received. If you are missing any of the above items, contact TOMAR Electronics Customer Service to request the missing part.

2. MOUNTING

THE 782-1228 WEIGHS APPROXIMATELY 2.5 POUNDS. FOR MOBILE VEHICULAR APPLICATIONS, THE INSTALLER MUST FIND A SAFE, STURDY MOUNTING LOCATION SO THAT IN THE EVENT OF AN ACCIDENT THE POWER SUPPLY CANNOT BECOME LOOSE WITHIN THE PASSENGER COMPARTMENT OF THE VEHICLE AND POTENTIALLY CAUSE IMPACT TO A PASSENGER.

The Model 782-1228 NEOBE® Power Supply is designed for mounting on a sturdy flat surface protected from rain, spills, excessive heat, and physical damage. It may be installed in the trunk of a car, the saddle bag of a motorcycle or other similar protected location. This device may also be installed in the engine compartment of a vehicle as long as it is mounted to a sturdy flat surface, as far away from the engine as possible.

Wiring for the device must be protected from cuts, nicks, abrasion, fraying or any form of accidental exposure to prevent contact with its high voltage output.

Mount the power supply so that its nameplate can be seen by maintenance personnel. It displays an important safety message and advises of the high voltage output.

The Model 782-1228 is potted in polyurethane to prevent any damage from vibration or moisture and is not intended for unprotected use exposed to direct water. The 782-1228-WP Waterproof Supply should be used whenever use of the supply will expose it to direct contact with rain. The Model 782-1228 -WP is completely waterproof and intended for outdoor use in extreme environments with long term exposure to water.

Mounting hardware and installation details are left to the installer.

3. POWER SUPPLY PROTECTION DESIGN

The 782-1228 Power Supply design includes protection against reversed polarity input voltage by incorporating an in-line fuse and a large high amperage internal shunt diode together to form a protection network.

The lamp output ports are protected from external shorts or opens in the lamps or wiring. The power supply will shut itself off if any lamp becomes shorted; no damage will be done to the supply. The supply will restart automatically as soon as the short is removed. The supply also includes output voltage regulators so that its energy storage capacitors will not be damaged if it is activated without lamps connected.

4. WIRING

DISCONNECT BATTERY OR OTHER POWER SOURCE BEFORE INSTALLING THE 782–1228.

INPUT POWER

The Model 782–1228 Power Supply is designed to operate from 12 or 28VDC automotive electrical systems. Input power is connected to the power supply via two FASTON type connectors. Mating input power wires are supplied in the install kit. The red wire is positive. The black wire is negative. Refer to the wiring diagram and use 14 AWG size wire minimum to connect the positive and negative power leads to the power supply, through a suitable customer supplied 20 Amp switch.

This power supply is polarity sensitive and will blow its fuse if connected to the wrong polarity. The 20 Amp input power fuse supplied is part of the polarity protection system. Do not attempt to operate the supply with the fuse bypassed or shorted at any time as the power supply will be irreparably damaged or destroyed and its warranty voided, if connected to the wrong polarity without proper size fuse protection.

LAMP CONNECTIONS

CAUTION: LAMP CONNECTIONS CARRY 600 VOLTS. USE EXTREME CAUTION.

Lamp 1 and Lamp 2 alternate with one another.

Cabling plugged into the lamp connectors must match the wire color code shown on the nameplate. Failure to observe color coding will cause short lamp life or failure of the power supply to operate at all.

When using shielded lamp cables, use the #18 AWG black power supply wire to ground the shields.

5. TESTING

Double check to verify that you have connected the power supply to the proper polarity before applying battery power.

Once you have completed the lamp port, control wiring and input wiring, you may reinstall the vehicle battery or reactivate the main power source.

If the main fuse or power input in-line fuse blows when power is applied to the power supply, check the input power wiring polarity. If backwards, simply reconnect correctly and replace the blown fuse.

Mounting hardware and installation details are left to the installer.

INSTALLATION IS NOW COMPLETE

TROUBLE SHOOTING WARNING

STROBE POWER SUPPLIES ARE HIGH VOLTAGE DEVICES AND CAN STORE LETHAL AMOUNTS OF ENERGY. DO NOT REMOVE OR CONNECT LAMPS OR TOUCH LAMPS WHILE IN OPERATION. DISCONNECT INCOMING POWER AT POWER SUPPLY AND WAIT 10 MINUTES BEFORE BEGINNING ANY SERVICE ON ANY PORTION OF A STROBE LIGHTING SYSTEM.

TROUBLE

THINGS TO CHECK

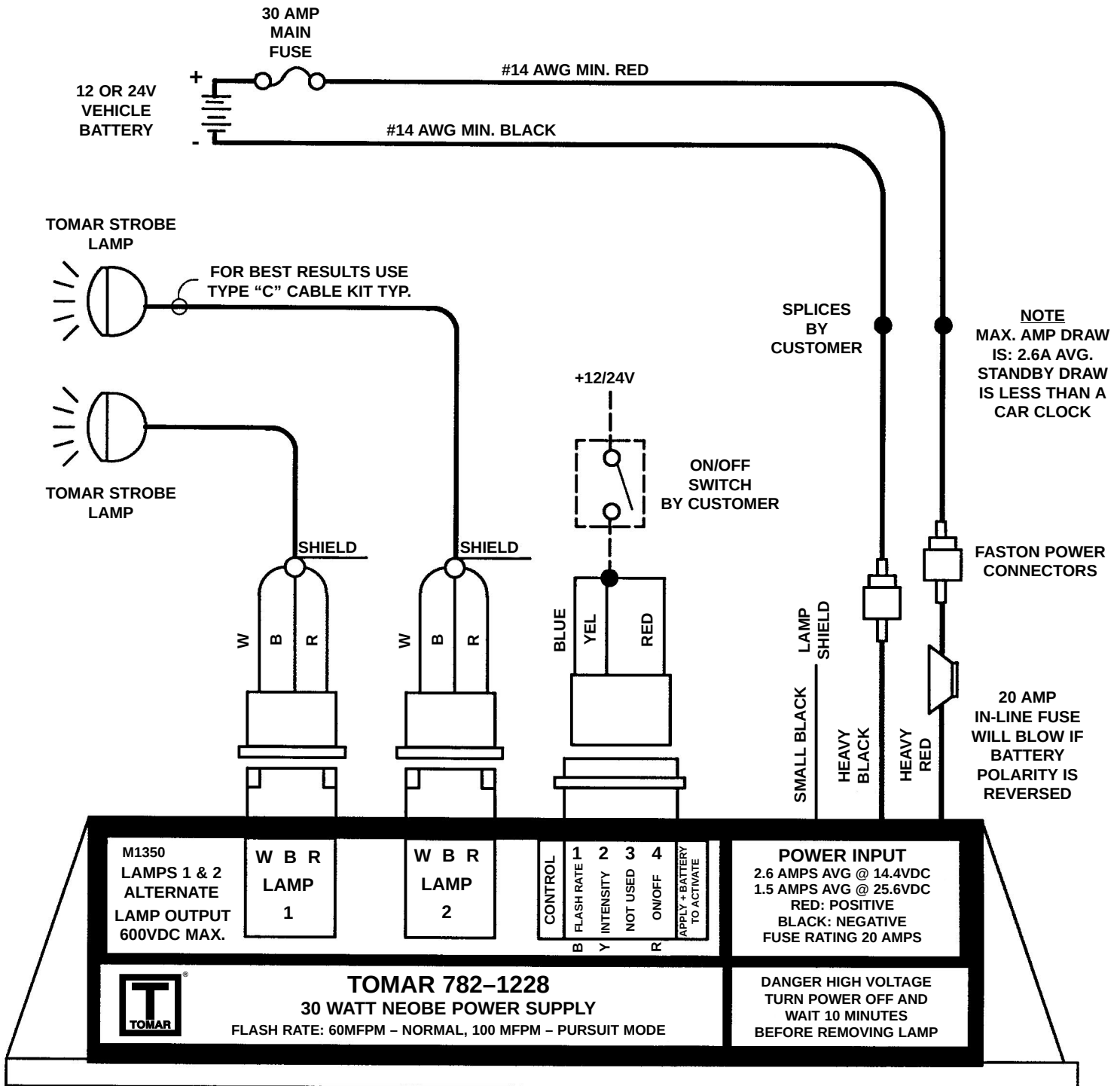
- | | |
|---------------------------------|--|
| Nothing Works | 1) Check battery or power source and main fuse or breaker. |
| | 2) Check ground connection. |
| Power Supply Blows In-Line Fuse | 1) Check for reverse polarity on input power connection. |
| | 2) Power supply may be defective. Replace with known good unit. |
| One Lamp Does Not Flash | 1) Check lamp by replacing it with known good lamp. |
| | 2) Check lamp cable by plugging a known good lamp directly into the non-functioning lighthouse port. |

MAINTENANCE

The 782–1228 NEOBE® Power Supply lighting system should be checked regularly for proper operation.

Lamps connected to the 782–1228 should be kept clean and checked monthly for signs of wear. If the lamp is blackened along more than approximately 30% of its length or flashes erratically, the lamp should be replaced.

782-1228 WIRING DIAGRAM



BATTERY WIRING

DISCONNECT BATTERY OR OTHER POWER SOURCE BEFORE INSTALLING THE 782-1228.

INPUT POWER

The Model 782-1228 Power Supply is designed to operate from 12 or 28VDC automotive electrical systems. Input power is connected to the power supply via two FASTON type connectors. Mating input power wires are supplied in the install kit. The red wire is positive. The black wire is negative. Refer to the wiring diagram and use 14 AWG size wire minimum to connect the positive and negative power leads to the power supply, through a suitable customer supplied 30 Amp fuse.

This power supply is polarity sensitive and will blow its fuse if connected to the wrong polarity. The 20 Amp input power fuse supplied is part of the polarity protection system. Do not attempt to operate the supply with the fuse bypassed or shorted at any time as the power supply will be irreparably damaged or destroyed and its warranty voided, if connected to the wrong polarity without proper size fuse protection.

LAMP CONNECTIONS

CAUTION: LAMP CONNECTIONS CARRY 600 VOLTS. USE EXTREME CAUTION.

Lamp 1 and Lamp 2 alternate with one another.

Cabling plugged into the lamp connectors must match the wire color code shown on the nameplate. Failure to observe color coding will cause short lamp life or failure of the power supply to operate at all.

When using shielded lamp cables, use the #18 AWG small black power supply wire to ground the lamp cable shields.

CONTROL CONNECTIONS

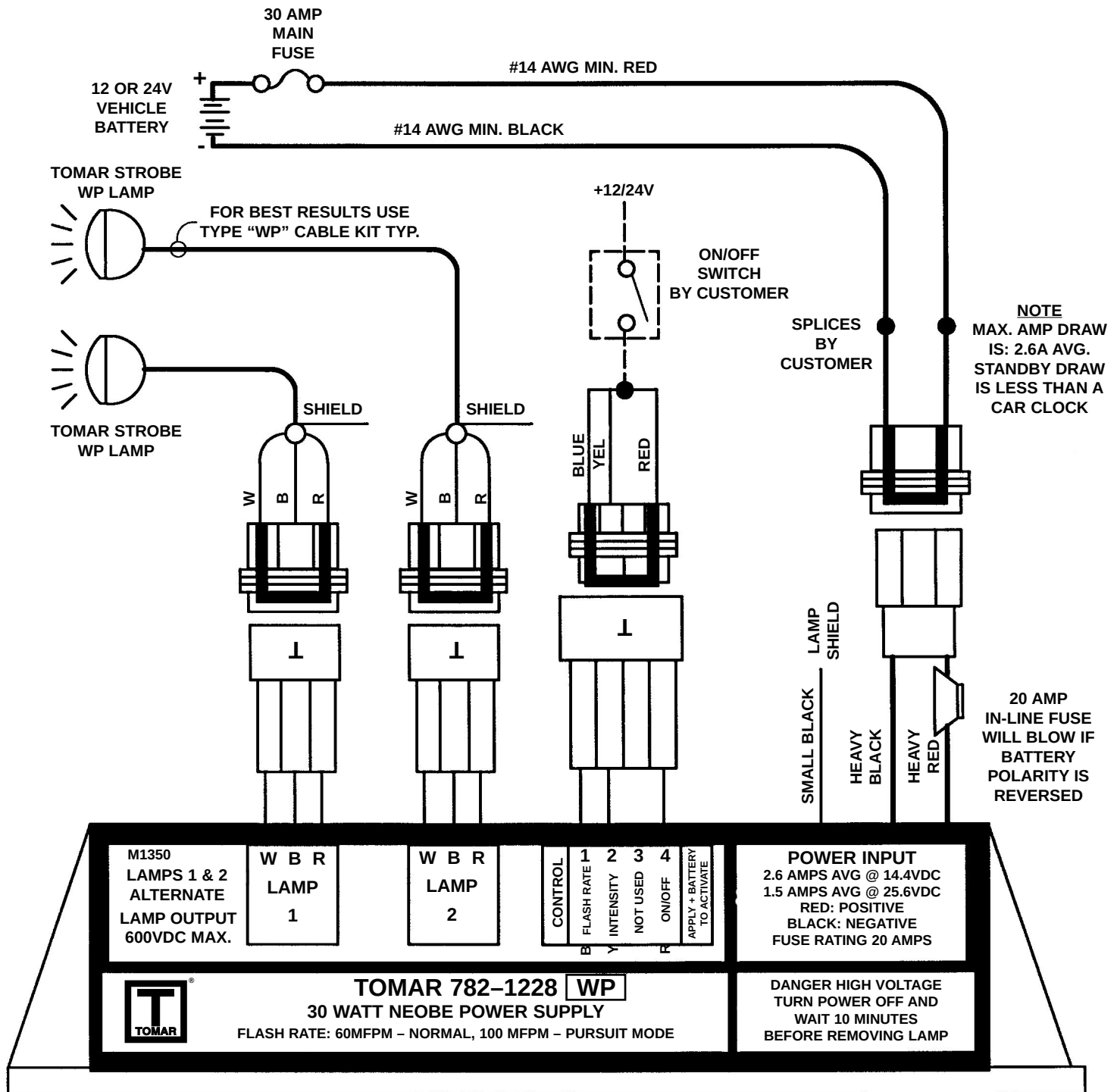
CONTROL WIRE HAVE LESS THAN 1/4 AMP CURRENT DRAW.

To activate lamps: Apply +12/24V to control wire 4 (RED).

To select Hi Intensity: Apply +12/24V to control wire 2 (YEL).

To select Hi Flash Rate: Apply +12/24V to control wire 1 (BLUE).

782-1228-WP WIRING DIAGRAM



BATTERY WIRING

DISCONNECT BATTERY OR OTHER POWER SOURCE BEFORE INSTALLING THE 782-1228.

INPUT POWER

The Model 782-1228-WP Power Supply is designed to operate from 12 or 28VDC automotive electrical systems. Input power is connected to the power supply via two FASTON type connectors. Mating input power wires are supplied in the install kit. The red wire is positive. The black wire is negative. Refer to the wiring diagram and use 14 AWG size wire minimum to connect the positive and negative power leads to the power supply, through a suitable customer supplied 30 Amp fuse.

This power supply is polarity sensitive and will blow its fuse if connected to the wrong polarity. The 20 Amp input power fuse supplied is part of the polarity protection system. Do not attempt to operate the supply with the fuse bypassed or shorted at any time as the power supply will be irreparably damaged or destroyed and its warranty voided, if connected to the wrong polarity without proper size fuse protection.

LAMP CONNECTIONS

CAUTION: LAMP CONNECTIONS CARRY 600 VOLTS. USE EXTREME CAUTION.

Lamp 1 and Lamp 2 alternate with one another.

Cabling plugged into the lamp connectors must match the wire color code shown on the nameplate. Failure to observe color coding will cause short lamp life or failure of the power supply to operate at all.

When using shielded lamp cables, use the #18 AWG small black power supply wire to ground the lamp cable shields.

CONTROL CONNECTIONS

CONTROL WIRE HAVE LESS THAN 1/4 AMP CURRENT DRAW.

To activate lamps: Apply +12/24V to control wire 4 (RED).

To select Hi Intensity: Apply +12/24V to control wire 2 (YEL).

To select Hi Flash Rate: Apply +12/24V to control wire 1 (BLUE).

PRODUCT DESCRIPTION

TOMAR Model 782–1228 NEOBE® Power Supply features a technology that produces the look of neon and the intensity of strobe lighting, combined into one lamp that appears to burn continuously rather than flash. The NEOBE® design produces more light per watt than any strobe power supply on the market. The result is unequalled warning light performance, far superior to a halogen, rotator, or conventional strobe. TOMAR Model 782–1228 NEOBE® Power Supply is designed to operate two remote strobe heads in a multiple flash alternating pattern. The unit features weather proof design and hi-low intensity, selected manually by a remote switch or automatically by remote mounted photocell. The 782–1228 operates on 12 thru 28VDC, features polarity protection diode and contains RFI filters for both high and low band. The TOMAR NEOBE® Power Supply features a revolutionary strobe circuit that extends the dwell time (on time) of the strobe as well as increasing the life of the strobe lamp by approximately 50%. Any TOMAR remote strobe lighthouse will operate with the Model 782–1228 Power Supply.

SPECIFICATIONS

Power Requirements:

2.6 A avg. @ 14.4VDC

1.5 A avg. @ 25.6VDC

Output Power Rating:

30 Watts Minimum in Hi-Intensity

NEOBE Flash Rate, 2 Lamps Running

Flash Rate:

60 MFPM/Head—NEOBE Rate Minimum

100 MFPM/Head—HYPER-NEOBE Rate Minimum

Flash Pattern:

5 Equal Power Flashes/Multi-Flash

Control Features:

On-Off and all features are controlled by switching positive low current battery voltage.

The main battery power may be left connected to the supply at all times. Current draw is less than 10 microamps in standby.

Construction:

Glass filled Lexan® case, polyurethane potting.

Size:

$\frac{7.125"}{(181\text{mm})} \times \frac{3.75"}{(95\text{mm})} \times \frac{1.75"}{(44\text{mm})}$

Weight:

$\frac{2.5 \text{ Lbs.}}{(1.12\text{kg})}$

OPERATING DUTY CYCLE

The 782–1228 and 782–1228–WP NEOBE® Power Supplies are rated for continuous operating duty, and are suitable for extended around the clock operation.

TOMAR NEOBE POWER SUPPLY WARRANTY

TOMAR Electronics, Inc. warrants the products described herein for a period of 10 years under normal use and service from the date of manufacture as marked on the product, that the product will be free of defects in material and workmanship. This warranty does not cover ordinary wear and tear, abuse, misuse, overloading, altered products, or damage caused by the purchaser connecting the unit to wrong voltage or polarity.

THERE IS NO WARRANTY OF MERCHANTABILITY. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION HEREIN. THERE ARE NO WARRANTIES EXPRESSED OR IMPLIED OR ANY AFFIRMATION OF FACT OR REPRESENTATION EXCEPT AS SET FORTH HEREIN.

REMEDY

TOMAR Electronics, Inc.'s sole responsibility and liability, and purchaser's exclusive remedy shall be limited to the repair or replacement at TOMAR's option, of a part or parts not so conforming to the warranty. All products requiring warranty service shall be returned to TOMAR within 10 years of manufacture, shipping prepaid. TOMAR will return repaired or replaced products to the purchaser via prepaid ground transportation. In no event shall TOMAR be liable for damages of any nature, including incidental or consequential damages, including but not limited to any damages resulting from non-conformity, defect in material or workmanship.

All material being returned for service must have an RMA number shown on the shipping label. Please write or call to obtain the RMA number prior to sending the material for service.

TOMAR Electronics, Inc.

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100% SOLID STATE MULTI-PATTERN ELECTRONIC FLASHER Q-SWITCH S. S. (ETQSSS)

Congratulations! You are now the proud owner of the most technically advanced true 100% Solid State Multi-Pattern Headlight Flasher System in the market today. Add to it our never ending commitment to quality, this new flasher system will provide you with years of dependable trouble free service.

The Q-Switch S.S. will operate a 2 or 4 headlight system on any vehicle with a 12 Vdc negative ground system.*

NOTE

Please contact Sound Off, Inc. before attempting to install on any foreign vehicle (non-General Motors, Ford or Chrysler) or one that has a Daylight Running circuit for its headlights.

A properly installed Q-Switch S.S. will continuously cycle through three flash patterns on a vehicle's high beam lights: a double flash wig wag (alternating) at 1.9 flashes per second, a simultaneous (modulating) flash at 3.0 flashes per second and a fast wig wag (alternating) flash at 3.0 flashes per second. When used at night, the low beam headlights remain ON for proper illumination while the high beams FLASH to gain attention and increase the vehicles visibility. When the dimmer switch is activated to high beam, the flasher system "High Beam Override" interrupts the flasher sequence to allow normal high beam function. Flashing automatically resumes when the dimmer switch is deactivated.

INSTALLATION

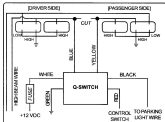
MOUNTING: Mount the flasher so that the maximum amount of air will flow across it, typically close to the battery at the front of the engine compartment.

GREEN WIRE: Connect to a convenient reliable ground.

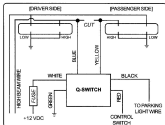
NOTE

Always connect the green wire to ground FIRST when installing and disconnect LAST when removing!

BLUE AND YELLOW WIRES: Locate the wire that supplies power to the passenger side high beam headlight. Cut this wire approximately 10" to 12" from the back of the headlight. Connect the yellow wire to the lead that returns to the passenger side high beam. Connect the blue wire to the other place of cut wire. This will make the drivers side high beam flash.



Wiring Schematic - 4 Lamp Install



Wiring Schematic - 2 Lamp Install

RED WIRE: Connect to a powered switch. This switch will only require 1/4 amp to activate the flasher.

WHITE WIRE: Connect through a fuse directly to the positive post of the battery or other high current power source. A 20 amp fuse to be used with a 2 headlight system and a 30 amp on a 4 headlight system. We recommend the use of a fuse ONLY - DO NOT CONNECT THE FLASHER SYSTEM TO A CIRCUIT BREAKER OR FUSIBLE LINK.

*We recommend no more than 12 amps per side to ensure maximum life.



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MULTI-PATTERN ELECTRONIC FLASHER

Q-SWITCH (EQS000)

Congratulations! You are now the proud owner of the most technically advanced Alternating Headlight Flasher System in the market today. Add to it our never ending commitment to quality, this new Flasher System will provide you with years of dependable trouble free service.

The Q-Switch will operate a two or four headlight system on any vehicle with a 12 VDC negative ground system.*

NOTE

Please contact Sound Off, Inc. before attempting to install on any foreign (non-General Motors, Ford or Chrysler) vehicle that has a Daylight Running circuit for its headlights.

A properly installed Q-Switch will continuously cycle through three flash patterns on a vehicle's high beam lights: a double flash wig wag (alternating) at 1.9 flashes per second, a simultaneous (modulating) flash at 3.0 flashes per second and a fast wig wag (alternating) flash at 3.0 flashes per second. When used at night, the low beam headlights remain ON for proper illumination while the high beams flash to gain attention and increase the vehicles visibility. When the dimmer switch is activated to high beam, the flasher systems "High Beam Override" interrupts the flasher sequence to allow for normal high beam function. Flashing automatically resumes when the dimmer switch is deactivated.

INSTALLATION

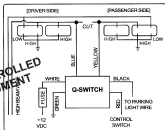
MOUNTING: Mount the flasher near the battery at the front of the engine compartment.

GREEN WIRE: Connect to a convenient reliable ground.

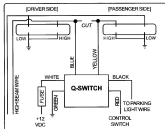
BLUE AND YELLOW WIRE: Locate the wire that supplies power to the passenger side high beam headlight. Cut this wire approximately 10" to 12" from the back of the headlight. Connect the yellow wire to the lead that returns to the passenger side high beam. Connect the blue wire to the other piece of the cut wire. This will make the drivers side high beam flash.

RED WIRE: Connect to a powered switch. This switch will only require 1/4 amp to activate the flasher.

*We engineered no more than 18 amps per side to ensure maximum useful life.



Wiring Schematic - 4 Lamp Install



Wiring Schematic - 2 Lamp Install

WHITE WIRE: Connect through a fuse directly to the positive post of the battery or other high current power source. A 20 amp fuse is to be used with a two headlight system and a 30 amp fuse on a 4 headlight system. We recommend the use of a fuse only. **DO NOT CONNECT THE FLASHER SYSTEM TO A CIRCUIT BREAKER OR FUSIBLE LINK.**

BLACK WIRE (OPTIONAL): If an "Automatic Nighttime Cut-off" is required, simply "T" or tap the black wire into a parking light wire. **DO NOT CONNECT TO THE LOW BEAM WIRE.** If not required, connect to ground.



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100% SOLID STATE MODULATING ELECTRONIC FLASHER

E.T.M. s.s. (Emergency Traffic Mover) (ETMSS-P)

Congratulations! You are now the proud owner of the most technically advanced, true 100% solid state modulating headlight flasher system in the market today. Add to it our never ending commitment to quality, this new flasher system will provide you with years of dependable, trouble free service.

The SOUND OFF, INC. E.T.M. s.s. will operate a two or four headlight system on any vehicle with a 12 VDC negative ground system.

NOTE

Please contact SOUND OFF, INC. before attempting to install on any foreign vehicle (non-General Motors, Ford, or Chrysler) or one that has a Daylight Running circuit for its headlights.

A properly installed E.T.M. s.s. will modulate the vehicles high beam lights at a constant flash rate (3.6 flashes per second). When used at night, the low beam headlights remain ON for proper illumination, while the high beams flash to gain attention and increase the vehicles visibility. When the dimmer switch is activated to hi-beam, the flasher systems "High Beam Override" interrupts the flasher sequence to allow normal high beam function. Flashing automatically resumes when the dimmer switch is deactivated.

INSTALLATION

MOUNTING: Mount the flasher so that maximum amount of air will flow across it, typically close to the battery at the front of the engine compartment.

GREEN WIRE: Connect to a convenient, reliable ground.

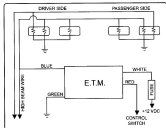
NOTE

Always connect the Green wire to ground FIRST when installing and disconnect LAST when removing!

RED WIRE: Connect to a powered switch. This switch will only require 1/4 amp to activate the flasher.

BLUE WIRE: "T" or tap either White wire to the vehicle's high beam headlight wire that runs between the dimmer switch and the driver side headlight.

WHITE WIRE: Connect the White wire through a fuse directly to the Positive post of the battery or other high current power source. (20 amp fuse to be used with a two headlight system, 30 amp on a 4 headlight system.) We recommend the use of a fuse only - **DO NOT CONNECT THE FLASHER SYSTEM TO A CIRCUIT BREAKER OR FUSIBLE LINK.**



WIRING SCHEMATIC

NOTE

Welding on ANY vehicle creates voltage spikes that may destroy this flasher system and void its warranty. Disconnect ALL connections before welding on vehicle or frame, or wait to install the flasher after welding is completed.

WARRANTY

Sound Off, Inc. warrants the ETMSS0 solid state electronic flasher system for 5 years from date of purchase, to the original purchaser, against any manufactured defects or workmanship. This warranty applies only to units installed according to manufacturer's installation instructions and operated within the unit's specifications.

Sound Off, Inc.'s obligation under this warranty is limited to repairing or exchanging the unit. Exchanging units under this warranty is as follows: 100% of purchase price for the first two years, 75% of purchase price the 3rd year, 50% of purchase price the 4th year, and 25% of purchase price the 5th year.

Warranty is void if the unit was installed incorrectly or maliciously damaged. All warranty claims must be accompanied by a dated proof of purchase.

Sound Off, Inc. retains the right to be the sole mediator of what constitutes defects in performance or manufacturing.

E.T.M. covered by U.S. Patent #s 4114071 & 4309638

ETMSS0-1700 04/01



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MODULATING ELECTRONIC FLASHER

E.T.M. (Emergency Traffic Mover) (ETETM0)

Congratulations! You are now the proud owner of the most technically advanced modulating headlight flasher system in the market today. Add to it our never ending commitment to quality, this new flasher system will provide you with years of dependable, trouble free service.

The SOUND OFF, INC. E.T.M. will operate a two or four headlight system on any vehicle with a 12 VDC negative ground system.

NOTE

Please contact SOUND OFF, INC. before attempting to install on any foreign vehicle (non-General Motors, Ford, or Chrysler) or one that has a Daylight Running circuit for its headlights.

A properly installed E.T.M. will modulate the vehicles high beam lights at a constant flash rate (3.6 flashes per second). When used at night, the low beam headlights remain ON for proper illumination, while the high beams flash to gain attention and increase the vehicles visibility. When the dimmer switch is activated to hi-beam, the flasher systems 'High Beam Override' interrupts the flasher sequence to allow normal high beam function. Flashing automatically resumes when the dimmer switch is deactivated.

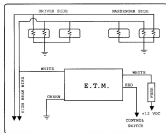
INSTALLATION

MOUNTING: Mount the flasher near the battery at the front of the engine compartment.

GREEN WIRE: Connect to a convenient, reliable ground.

RED WIRE: Connect to a powered switch. This switch will only require 1/4 amp to activate the flasher.

WHITE WIRES: "T" or tap either white wire to the vehicle's high beam headlight wire that runs between the dimmer switch and the driver side headlight. Connect the remaining white wire through a fuse directly to the Positive post of the battery or other high current power source. (20 amp fuse to be used with a two headlight system, 30 amp on a 4 headlight system.) We recommend the use of a fuse only - **DO NOT CONNECT THE FLASHER SYSTEM TO A CIRCUIT BREAKER OR FUSIBLE LINK.**



WIRING SCHEMATIC

NOTE

Welding on ANY vehicle creates voltage spikes that may destroy this flasher system and void its warranty. Disconnect ALL connections before welding on vehicle or frame, or wait to install the flasher after welding is completed.

WARRANTY

Sound Off, Inc. warrants the ETETM0 electronic flasher system for 1 (one) full year from date of purchase, to the original purchaser, against any manufactured defects or workmanship. This warranty applies only to units installed according to manufacturer's installation instructions and operated within the units specifications.

Warranty is void if the unit was installed incorrectly or maliciously damaged.

All warranty claims must be accompanied by a dated proof of purchase.

Sound Off, Inc. retains the right to be the sole mediator of what constitutes defects in performance or manufacturing.

E.T.M. covered by U.S. Patent #'s 4114071 & 4309639

ETETM0000 0001



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100% SOLID STATE ALTERNATING ELECTRONIC FLASHER

ROAD RUNNER S. S. (ETRSSS)

POWER PULSE S. S. (ETPPSS)

Congratulations! You are now the proud owner of the most technically advanced, true 100% solid state alternating headlight flasher system in the market today. Add to it our never ending commitment to quality, this new flasher system will provide you with years of dependable, trouble-free service.

The Road Runner S.S. or Power Pulse S.S. will operate a two or four headlight system on any vehicle with a 12 VDC negative ground system.*

NOTE

This Flasher will not work on any groundless lighting system. If you have any questions regarding the type of system your vehicle has contact Sound Off, Inc.'s Technical Support Department at 1-800-338-7337.

A properly installed Road Runner S.S. or Power Pulse S.S. will alternate the vehicles high beam lights at a constant flash rate (1.9 flashes per second for the Road Runner, 3.0 flashes per second for the Power Pulse). When used at night, the low beam headlights remain ON for proper illumination, while the high beams flash to gain attention and increase the vehicles visibility. When the dimmer switch is activated to hi-beam, the flasher systems 'High Beam Override' interrupts the flasher sequence to allow normal high beam function. Flashing automatically resumes when the dimmer switch is deactivated.

NOTE

Flashing Headlight and Taillight Systems are intended for use on approved vehicles ONLY. It is the responsibility of the user of these systems to insure compliance to any Federal, State or Municipal regulations which may apply.

INSTALLATION

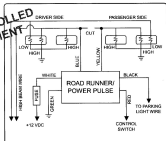
MOUNTING: Mount the flasher so that maximum amount of air will flow across it, typically close to the battery at the front of the engine compartment.

GREEN WIRE: Connected to a convenient, reliable ground.

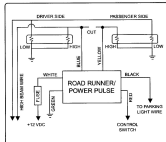
NOTE

Always connect the Green wire to ground FIRST when installing and disconnect LAST when removing!

BLUE & YELLOW WIRE: Locate the wire that supplies power to the passenger side high beam headlight. Cut this wire approximately 10" to 12" from the back of the headlight. Connect the Yellow wire to the lead that returns to the passenger side high beam. Connect the Blue wire to the other piece of cut wire (this will make the drivers side high beam flash).



WIRING SCHEMATIC - 4 LAMP INSTALLATION



WIRING SCHEMATIC - 2 LAMP INSTALLATION

RED WIRE: Connect to a powered switch. This switch will only require 1/4 amp to activate the flasher.

WHITE WIRE: Connect through an ATO type fuse (20 amp) to the positive post of the battery. **DO NOT USE A CIRCUIT BREAKER, FUSIBLE LINK OR SLOW BLOW TYPE FUSE.**

NOTE

Older 4 bulb Sealed Beam Headlight Systems may require a 30 amp fuse. Call Sound Off, Inc.'s Technical Service Department at 1-800-338-7337 for any further assistance.

NOTE

DO NOT connect the Red and White wires together. The White wire must receive a constant source of power at all times.

OPTIONAL - BLACK WIRE: If an 'Automatic Night time Cut-off' is required, simply "T" or tap the black wire into a parking light wire. **DO NOT CONNECT TO THE LOW BEAM WIRE. If not required, connect to ground.**

*We recommend no more than 12 amps per side to ensure maximum useful life.

WARRANTY

Sound Off, Inc. warrants the ETRRSS and ETPRSS solid state electronic flasher systems for 5 years from date of purchase, to the original purchaser, against any manufactured defects or workmanship. This warranty applies only to units installed according to manufacturer's installation instructions and operated within the units specifications.

Sound Off, Inc.'s obligation under this warranty is limited to repairing or exchanging the unit. Exchanging units under this warranty is as follows: 100% of purchase price for the first two years, 75% of purchase price the 3rd year, 50% of purchase price the 4th year, and 25% of purchase price the 5th year.

Warranty is void if the unit was installed incorrectly or maliciously damaged.

All warranty claims must be accompanied by a dated proof of purchase.

Sound Off, Inc. retains the right to be the sole mediator of what constitutes defects in performance or manufacturing.

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UNCONTROLLED
DOCUMENT



**MANUFACTURERS OF EMERGENCY
AND COMMERCIAL VEHICLE LIGHTING**

5132 37th AVE.
P.O. BOX 296
HUDSONVILLE, MI 48426

800-308-7337 • 616-669-0230 • FAX: 616-669-3475 • E-mail: sol-sales@soundoffinc.com • Website: www.soundoffinc.com

**ALTERNATING ELECTRONIC FLASHER
ROAD RUNNER (ETRR00)
POWER PULSE (ETPP00)**

Congratulations! You are now the proud owner of the most technically advanced alternating headlight flasher system in the market today. Add to it our never ending commitment to quality, this new flasher system will provide you years of dependable, trouble free service.

The Road Runner or Power Pulse will operate a two or four headlight system on any vehicle with a 12 VDC negative ground system.*

NOTE

Please contact SOUND OFF, INC. before attempting to install on any foreign vehicle (non-General Motors, Ford, or Chrysler) or one that has a Daylight Running circuit for its headlights.

A properly installed Road Runner or Power Pulse will alternate the vehicles high beam lights at a constant flash rate (1.9 flashes per second for the Road Runner; 3.0 flashes per second for the Power Pulse). When used at night, the low beam headlights remain ON for proper illumination, while the high beams flash to gain attention and increase the vehicles visibility. When the dimmer switch is activated to hi-beam, the flasher systems 'High Beam Override' interrupts the flasher sequence to allow normal high beam function. Flashing automatically resumes when the dimmer switch is deactivated.

INSTALLATION

MOUNTING: Mount the flasher near the battery at the front of the engine compartment.

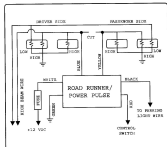
GREEN WIRE: Connect to a convenient, reliable ground.

BLUE & YELLOW WIRE: Locate the wire that supplies power to the passenger side high beam headlight. Cut this wire approximately 10" to 12" from the back of the headlight. Connect the Yellow wire to the lead that returns to the passenger side high beam. Connect the Blue wire to the other piece of cut wire (this will make the drivers side high beam flash).

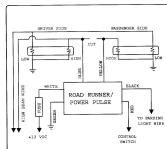
RED WIRE: Connect to a powered switch. This switch will only require 1/4 amp to activate the flasher.

WHITE WIRE: Connect through a fuse directly to the Positive post of the battery or other high current power source. (20 amp fuse to be used with a two headlight system, 30 amp on a 4 headlight system.) We recommend the use of a fuse only - **DO NOT CONNECT THE FLASHER SYSTEM TO A CIRCUIT BREAKER OR FUSIBLE LINK.**

OPTIONAL - BLACK WIRE: If an 'Automatic Nighttime Cutoff' is required, simply "T" or tap the black wire into a parking light wire, **DO NOT CONNECT TO THE LOW BEAM WIRE.** If not required, cut off excess wire and tape end.



WIRING SCHEMATIC - 4 LAMP INSTALLATION



WIRING SCHEMATIC - 2 LAMP INSTALLATION

NOTE

Welding on ANY vehicle creates voltage spikes that may destroy this flasher system and void its warranty. Disconnect ALL connections before welding on vehicle or frame, or wait to install the flasher after welding is completed.

*We recommend no more than 10 amps per side to ensure maximum useful life.

WARRANTY

Sound Off, Inc. warrants the ETFR00 and ETPP00 electronic flasher systems for 1 (one) full year from date of purchase, to the original purchaser, against any manufactured defects or workmanship. This warranty applies only to units installed according to manufacturer's installation instructions and operated within the units specifications.

Warranty is void if the unit was installed incorrectly or maliciously damaged.

All warranty claims must be accompanied by a dated proof of purchase.

Sound Off, Inc. retains the right to be the sole mediator of what constitutes defects in performance or manufacturing.

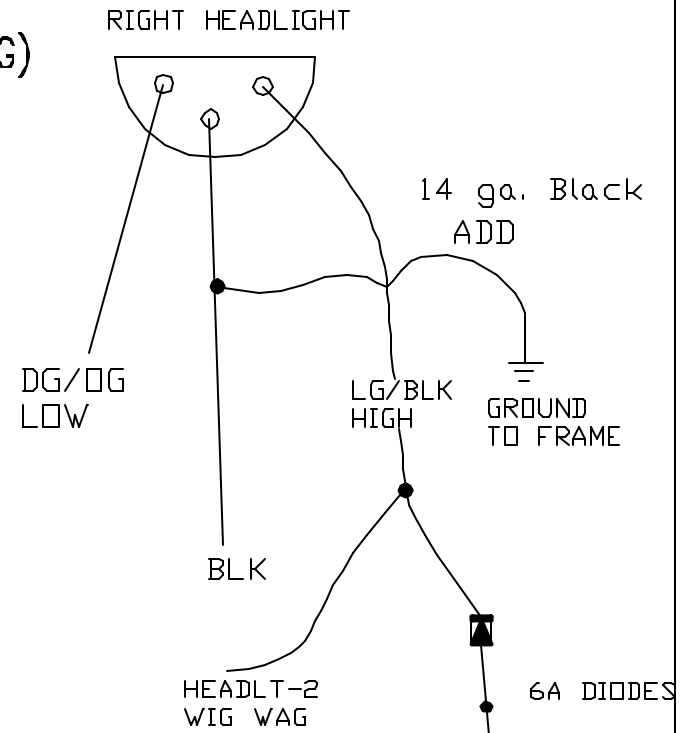
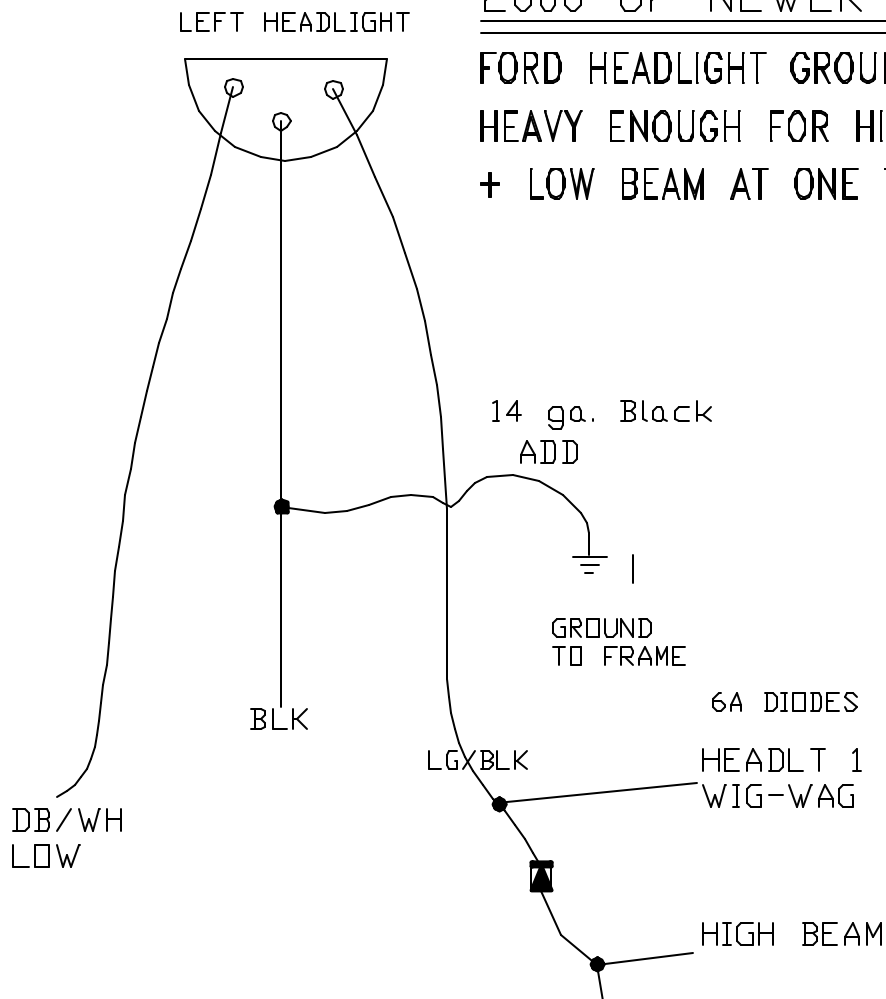
Covered under U.S. Patent #4114371 and #4309639

9-22

FORD F-SERIES HEADLIGHT CIRCUIT WITH WIG-WAG FLASHER INSTALLED

2000 or NEWER FORD F-SERIES ONLY

FORD HEADLIGHT GROUND IS NOT
HEAVY ENOUGH FOR HIGH (WIG-WAG)
+ LOW BEAM AT ONE TIME.

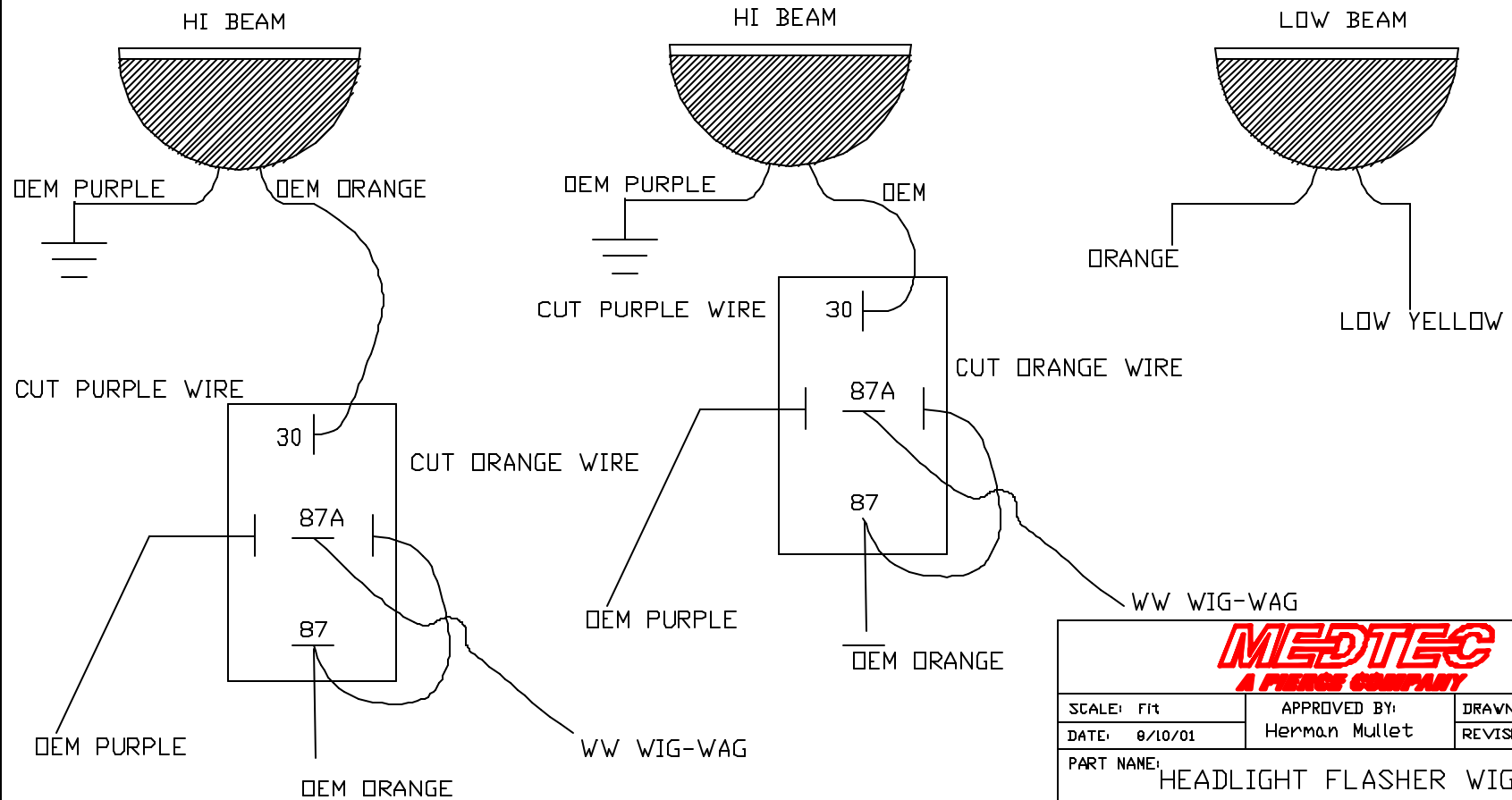


MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 6/29/01	REVISID:	
PART NAME: HEADLIGHT FLASHER WIG-WAG		
		DRAWING NUMBER: 9-22.DWG

CHEVY WIG-WAG

9-23



MEDTEC A PIERCE COMPANY		
SCALE: 1/16"	APPROVED BY: Herman Mullet	DRAWN BY: PSP
DATE: 8/10/01		REVISED: 8/23/01
PART NAME: HEADLIGHT FLASHER WIG-WAG		
		DRAWING NUMBER: 9-23.DWG

MOUNTING THE KKKEPS POWER SUPPLY

- THE KKKEPS SHOULD BE MOUNTED ON A METAL SURFACE TO AID HEAT DISSIPATION. BE SURE THAT THIS SURFACE IS NOT ONE THAT EITHER GENERATES OR IS EXPOSED TO EXCESSIVE HEAT DURING NORMAL OPERATION OF THE VEHICLE.
- DO NOT SELECT A LOCATION WHERE THE KKKEPS WILL BE EXPOSED TO POTENTIAL DAMAGE FROM ANY UNSECURED OR LOOSE EQUIPMENT IN THE VEHICLE.
- BE SURE THAT THE KKKEPS VENTILATION OPENINGS ARE UNOBSTRUCTED. MAINTAIN A DISTANCE OF AT LEAST 2" (TWO INCHES) BETWEEN THESE OPENINGS AND ANY SURFACE.
- BE SURE THE AREA SELECTED WILL NOT ALLOW THE KKKEPS TO BE EXPOSED TO WATER. THE KKKEPS IS NOT WATERPROOF!
- THE TWO POWER SUPPLIES MUST BE MOUNTED BESIDE EACH OTHER.
- WHEN ROUTING THE KKKEPS'S WIRES, IT IS IMPORTANT TO CHOOSE A PATH THAT WILL KEEP THESE WIRES AWAY FROM EXCESSIVE HEAT AND FROM ANY VEHICLE EQUIPMENT THAT COULD COMPROMISE THE INTEGRITY OF THE WIRES (EX. COMPARTMENT DOORS, UN-GROMMETED HOLES, ETC.).
- WHEN THE BEST MOUNTING LOCATION HAS BEEN DETERMINED, SECURELY FASTEN THE KKKEPS TO ITS MOUNTING SURFACE USING #10 SHEET METAL SCREWS.

WIRING THE KKKEPS POWER SUPPLY

- USING 8 AWG WIRE, CONNECT THE POSITIVE (+) TERMINAL OF POWER SUPPLY "A" TO +12 VDC. FUSE AT 30 AMPS.
- CONNECT THE POSITIVE (+) TERMINAL OF POWER SUPPLY "B" TO +12VDC. FOR WIRE LENGTH LESS THAN 27 FEET, USE 8 AWG; FOR 27 TO 42 FEET, USE 6 AWG. FUSE AT 30 AMPS.
- USING 8 AWG WIRE, CONNECT THE GROUND (GND) TERMINAL OF POWER SUPPLY "A" TO CHASSIS GROUND/ GROUND BUS.
- USING 8 AWG WIRE, CONNECT THE GROUND (GND) TERMINAL OF POWER SUPPLY "B" TO CHASSIS GROUND/ GROUND BUS.

WIRING THE STROBE LIGHTHEADS

- CUT THE STROBE LIGHTHEAD CABLES TO THEIR NECESSARY LENGTHS.

- INSTALL THE SOCKET-TYPE TERMINALS ON THE LIGHT-HEAD END OF THE STROBE CABLES. NOTE: THE SHIELD DRAIN WIRE (NON-INSULATED) IS NOT USED AT THIS END AND MAY BE TRIMMED FLUSH WITH THE HARNESS JACKET.
- INSTALL THE PIN-TYPE TERMINALS ON THE POWER SUPPLY END OF THE STROBE CABLES. NOTE: THE SHIELD DRAIN WIRE (NON-INSULATED) WILL BE GROUNDED TO THE POWER SUPPLY MOUNTING SCREW ADJACENT TO THE STROBE OUTLETS.
- INSERT THE SOCKET-TYPE TERMINALS INTO THE CONNECTORS DESIGNED TO PLUG INTO THE STROBE LIGHT-HEAD AS FOLLOWS:

Pos. 1 - RED wire

Pos. 2 - BLACK wire

Pos. 3 - WHITE wire

- INSERT THE PIN-TYPE TERMINALS INTO THE CONNECTORS DESIGNED TO PLUG INTO THE POWER SUPPLY'S STROBE OUTLET AS FOLLOWS:

Pos. 1 - RED wire

Pos. 2 - BLACK wire

Pos. 3 - WHITE wire

- ROUTE THE STROBE CABLES FROM THE POWER SUPPLY STROBE OUTLET TO THAT OUTLET'S DESIGNATED LIGHTHEAD. INSERT CONNECTOR INTO LIGHTHEAD PLUG. REFER TO PAGE 2 FOR LIGHTHEAD DESIGNATION CHART.
- PLUG THE OPPOSITE END INTO ITS DESIGNATED STROBE OUTLET. GROUND THE SHIELD DRAIN WIRE TO THE NEAREST POWER SUPPLY MOUNTING SCREW.
- REPEAT FOR ALL REMAINING STROBE CABLES.

CONTROL HARNESS CONNECTIONS

- REFER TO WIRING SCHEMATIC.

STROBE OUTLET DESIGNATIONS

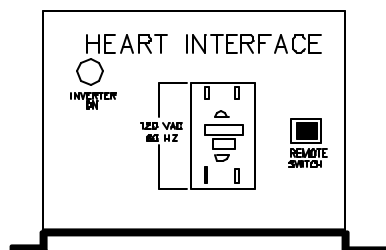
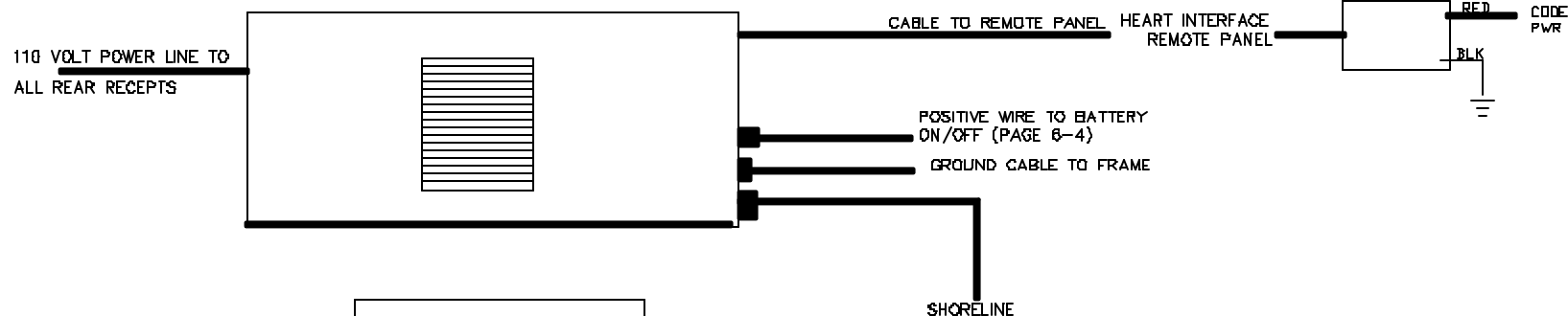
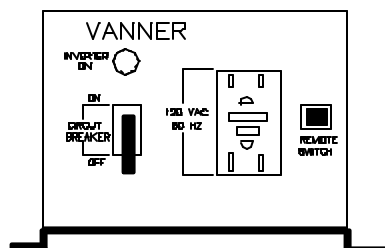
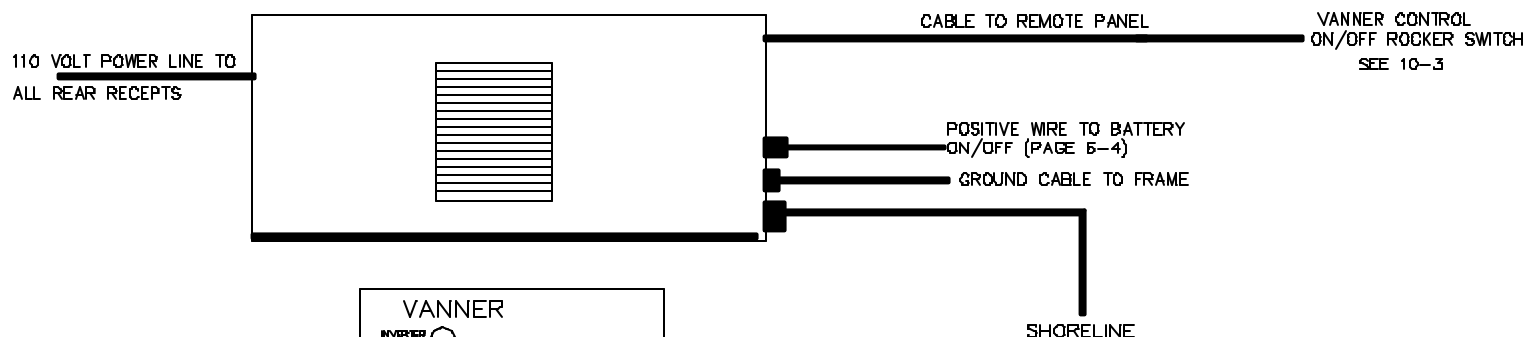
- REFER TO POWER SUPPLY LABELS.

SWITCH CONNECTIONS

- REFER TO WIRING SCHEMATIC.

DIP SWITCH FUNCTIONALITY

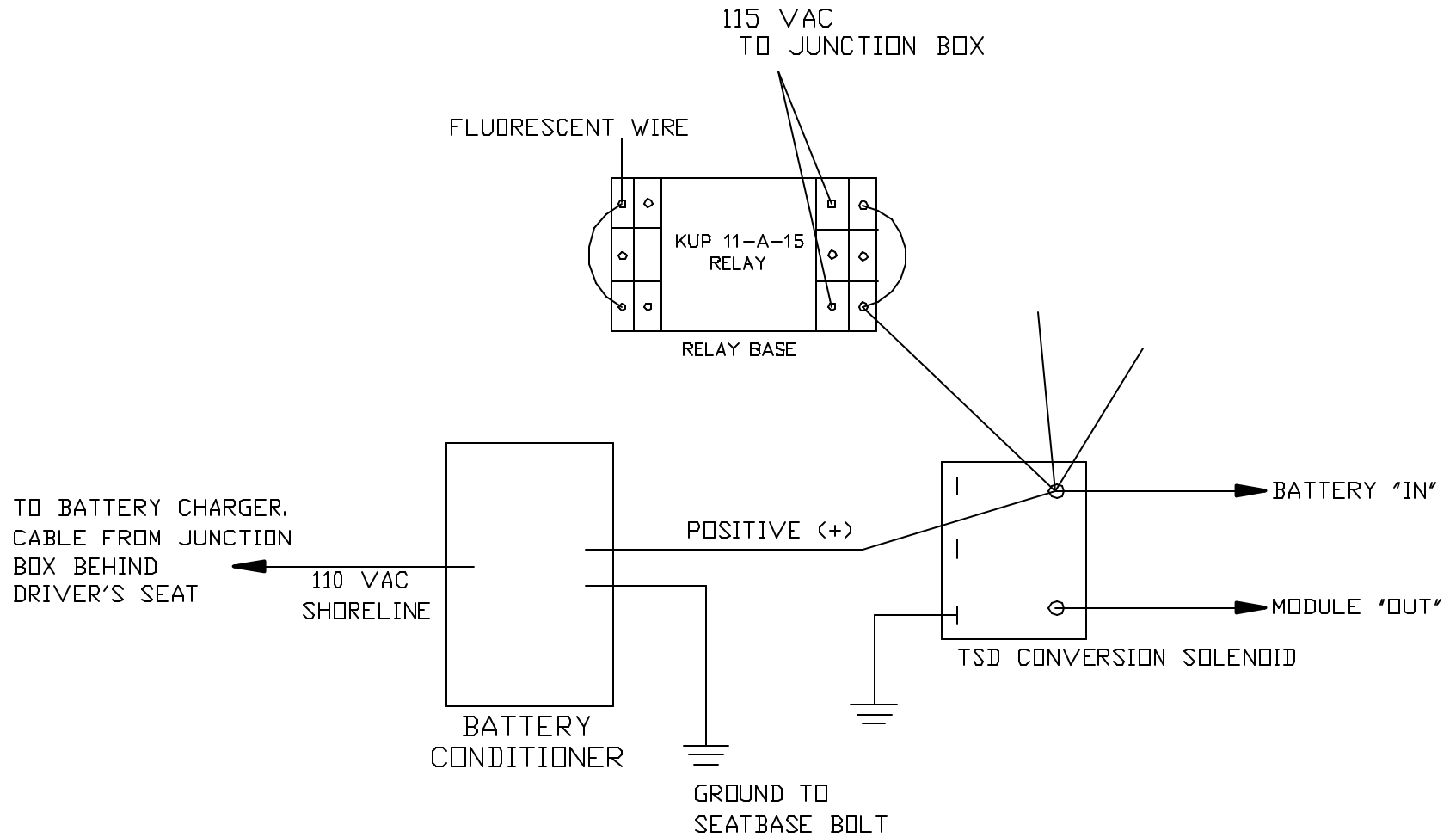
- REFER TO DIP SWITCH CONFIGURATION TABLE.



MEDTEC
A PARSONS COMPANY

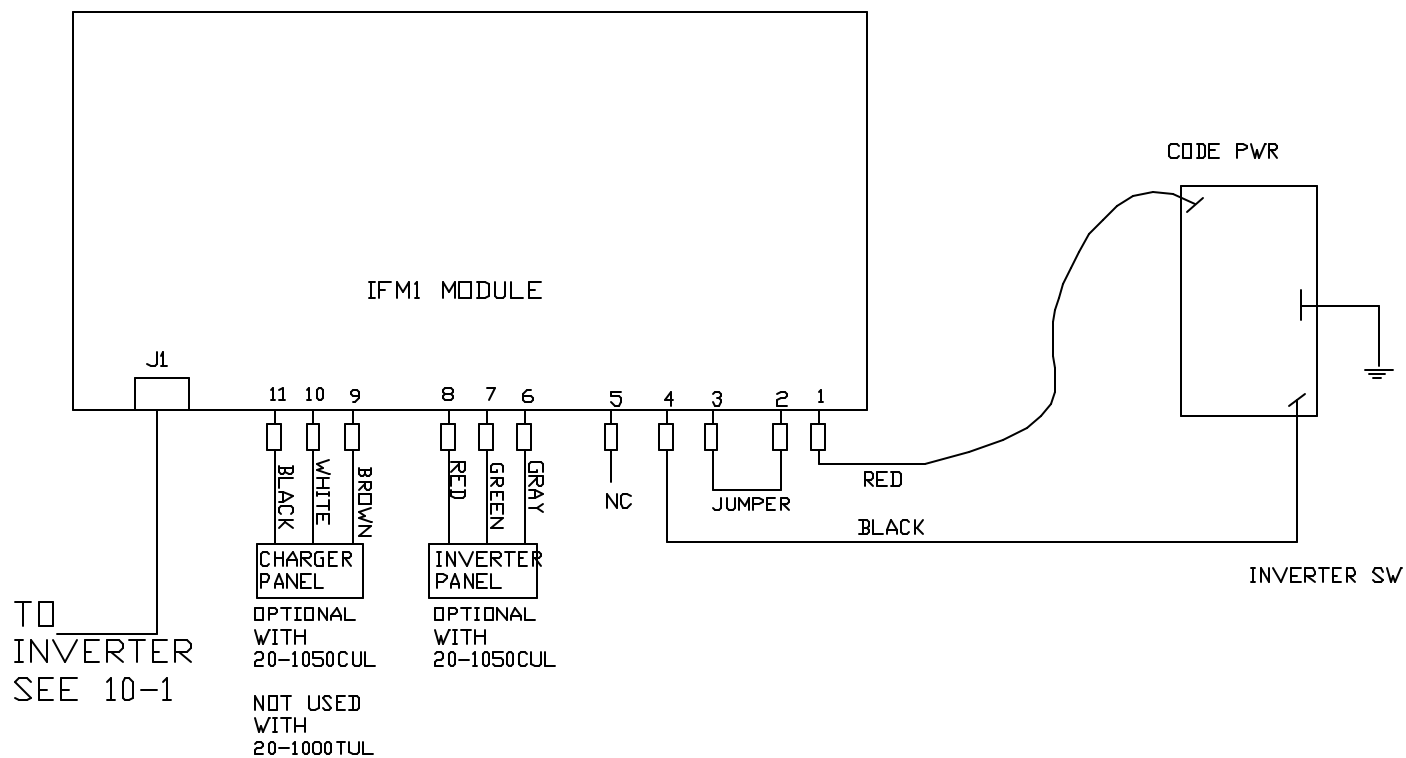
SCALE: FT	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: Inverter & Battery Charger		
		DRAWING NUMBER: 10-1.DWG

10-2



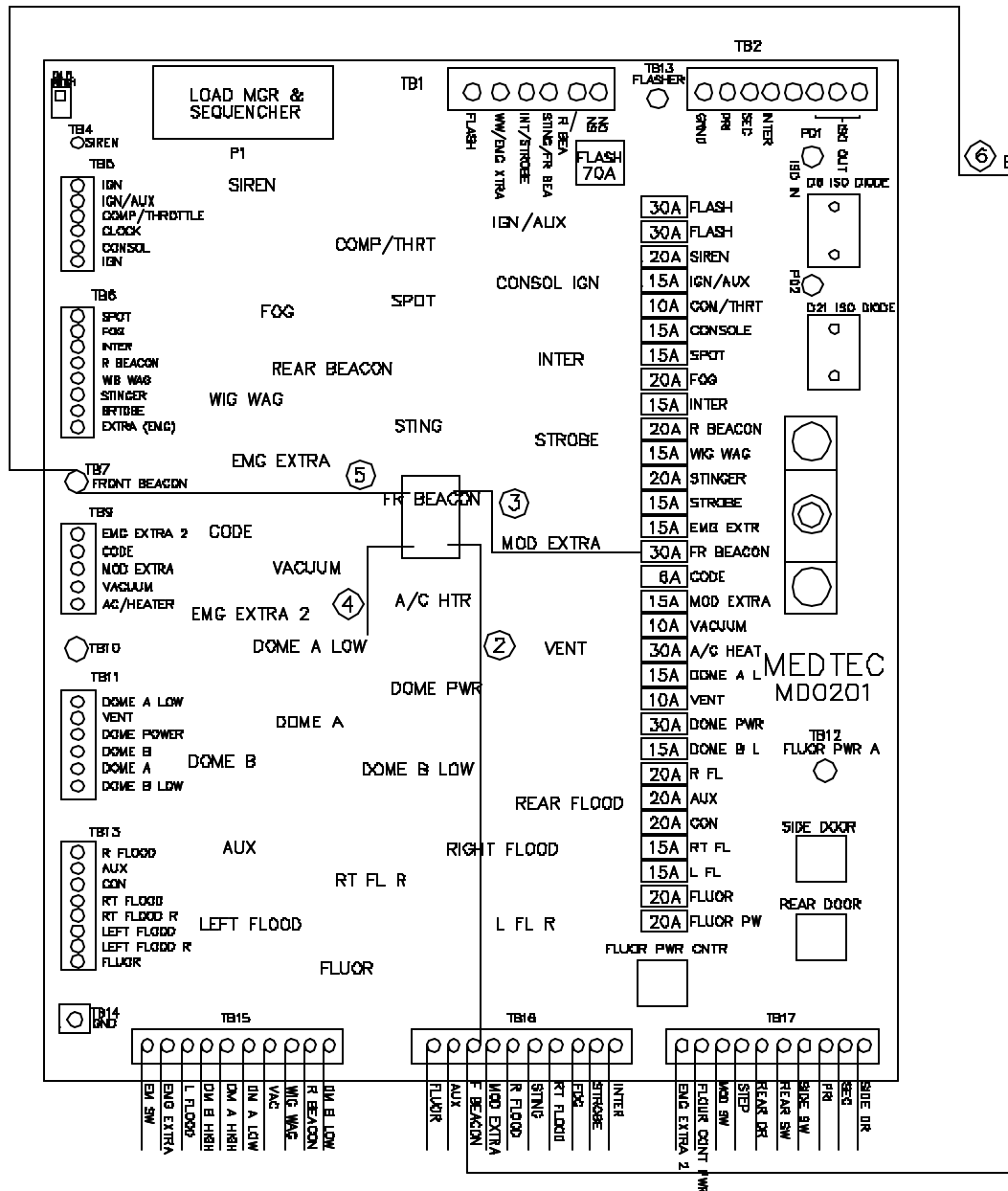
MEDTEC A FURBER COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Herman Mullet	REVISED:
PART NAME: Battery Conditioner		
		DRAWING NUMBER: 10-2.DWG

10-3

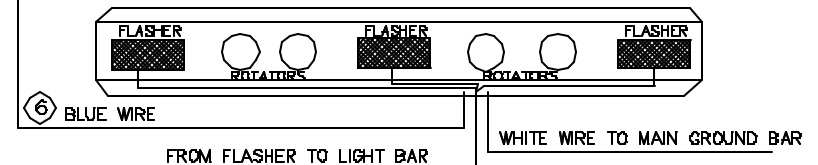


MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 5/14/03	Herman Mullet	REVISED:
PART NAME: Vanner Inverter Hook-up		
		DRAWING NUMBER: 10-3.DWG

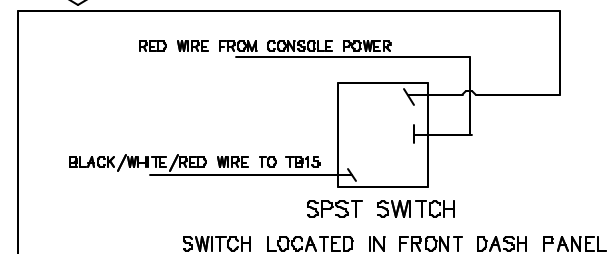


FRONT EDGEBAR



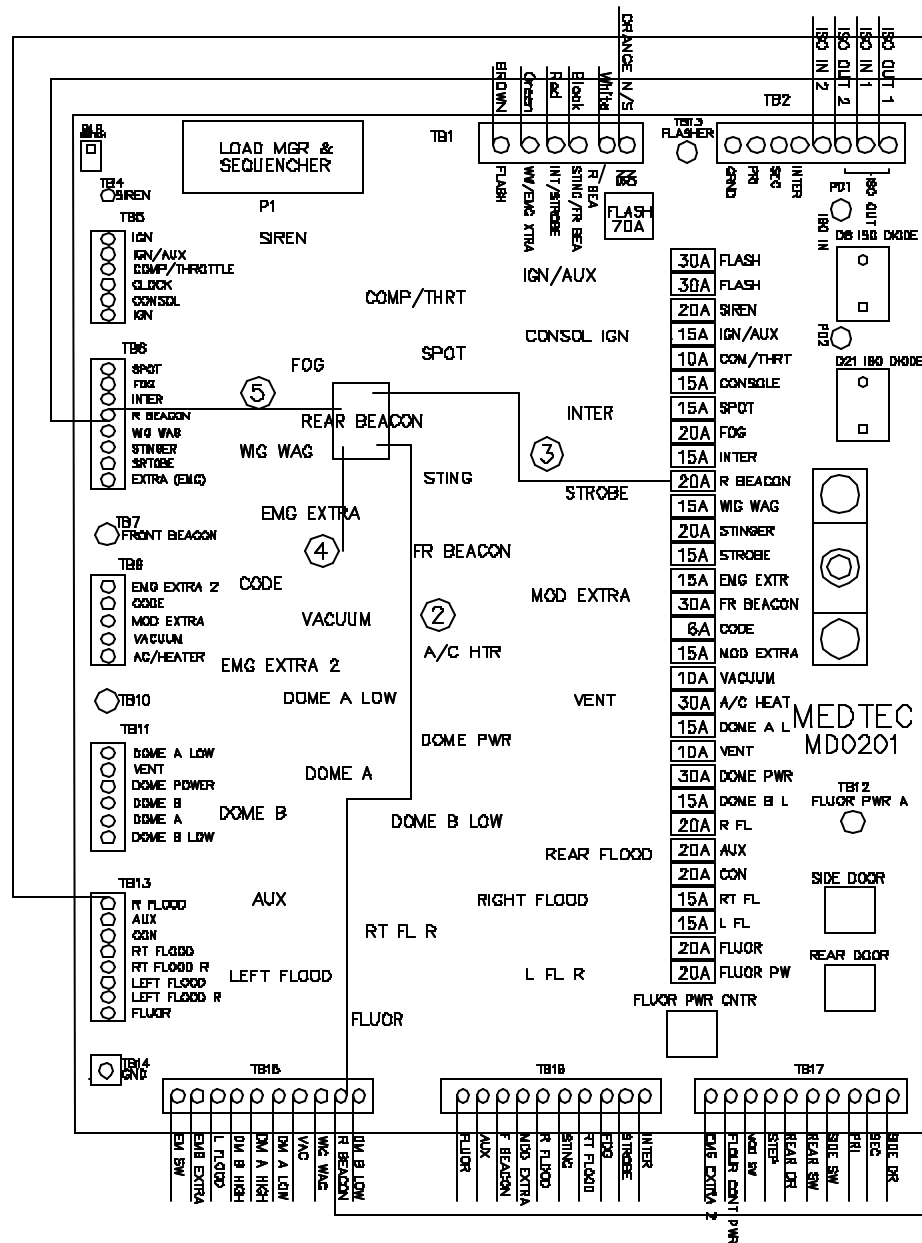
1. BLACK WIRE FROM SPST SWITCH TO TERMINAL F BEC "IN"
2. COPPER LEAD FROM TERMINAL F BEC "IN" TO 40 AMP F BEC RELAY
3. COPPER LEAD FROM 30 AMP BREAKER TO 40 AMP F BEC RELAY
4. COPPER LEAD FROM 40 AMP F BEC RELAY TO GROUND THROUGH EMERGENCY SWITCH
5. COPPER LEAD FROM 40 AMP F BEC RELAY TO TERMINAL F BEC "OUT"
6. BLUE WIRE FROM TERMINAL F BEC "OUT" TO LIGHTBAR

① BLACK WIRE

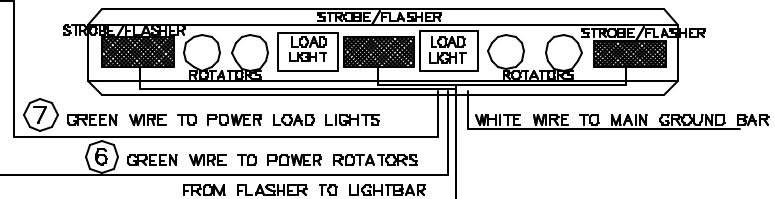


MEDTEC
A PIERCE COMPANY

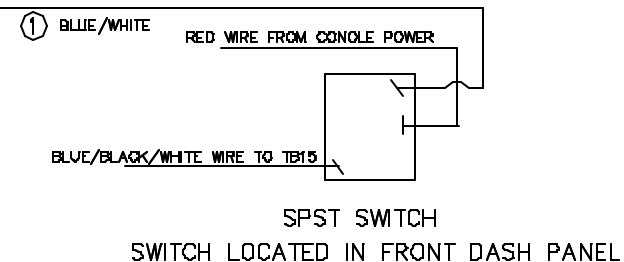
SCALE: 1/4"	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02	REVISD:	
PART NAME: Front Edgebar		
MD0201		DRAWING NUMBER: 11-1.DWG



REAR EDGEBAR

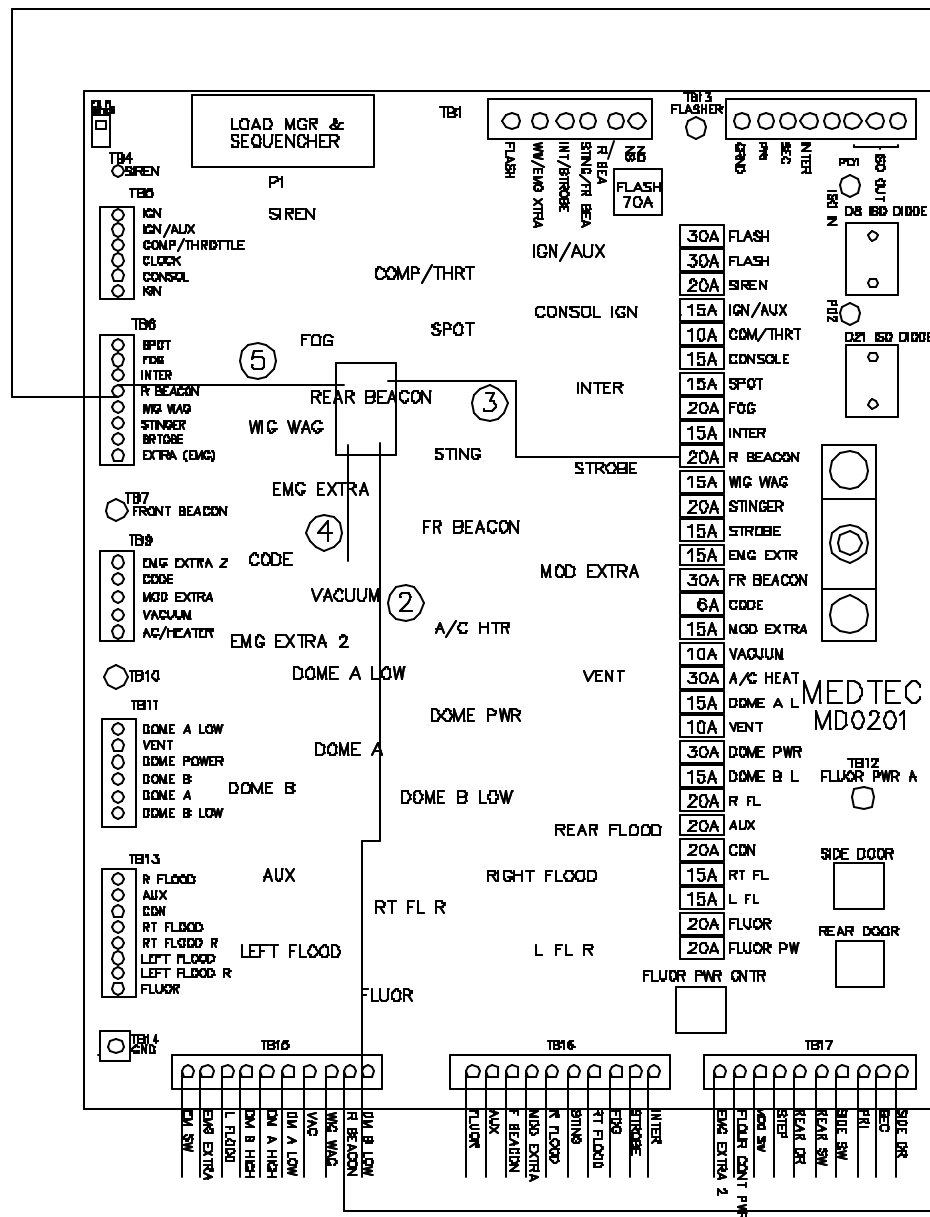


1. BLUE/WHITE WIRE FROM SPST SWITCH TO TERMINAL R BEC "IN"
2. COPPER LEAD FROM TERMINAL R BEC "IN" TO 20 AMP R BEC RELAY
3. COPPER LEAD FROM 20 AMP BREAKER TO 20 AMP R BEC RELAY
4. COPPER LEAD FROM 20 AMP R BEC RELAY TO GROUND THROUGH EMERGENCY SWITCH
5. COPPER LEAD FROM 20 AMP R BEC RELAY TO TERMINAL R BEC "OUT"
6. BLUE WIRE FROM TERMINAL R BEC "OUT" TO POWER ROTATORS
7. GREEN WIRE FROM TERMINAL R FL "OUT" TO POWER LOAD LIGHTS



MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: seb
DATE: 8/20/02	Rodney Burnham	REVISED:
PART NAME:	Rear Edgebar	
MD0201	DRAWING NUMBER: 11-2.DWG	



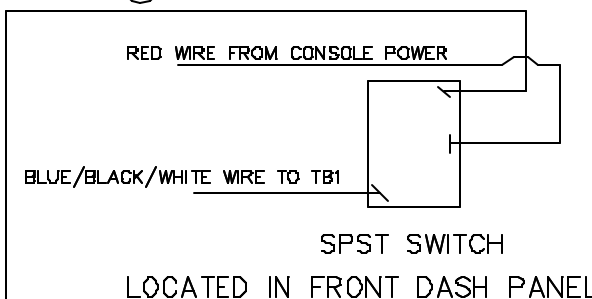
SMALL LIGHTBAR

ROTATOR MIRROR ROTATOR

⑥ GREEN WIRE WHITE WIRE TO MAIN GROUND BAR

1. BLUE/WHITE WIRE FROM SPST SWITCH TO TERMINAL R BEC "IN"
2. COPPER LEAD FROM TERMINAL R BEC "IN" TO AMP R BEC RELAY
3. COPPER LEAD FROM 15 AMP BREAKER TO 20 AMP R BEC RELAY
4. COPPER LEAD FROM 20 AMP R BEC RELAY TO GROUND THROUGH EMERGENCY SWITCH
5. COPPER LEAD FROM 20 AMP R BEC RELAY TO TERMINAL R BEC "OUT"
6. GREEN WIRE FROM TERMINAL R BEC "OUT" TO LIGHTBAR

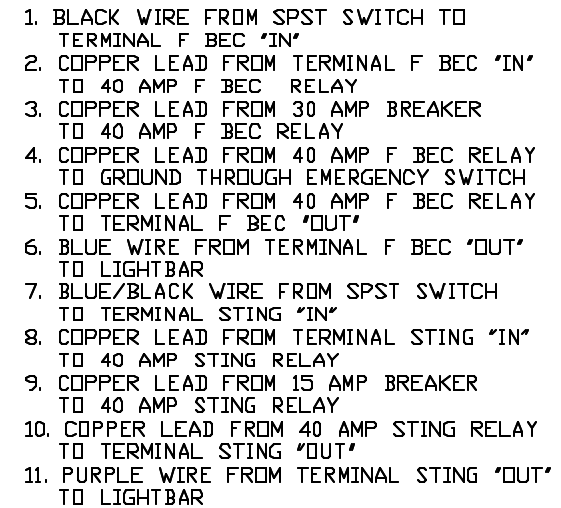
③ BLUE/WHITE WIRE



MEDTEC
A PIERCE COMPANY

SCALE: 1ft	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED:
PART NAME: Small Lightbar Rearbeacon		
MD0201		DRAWING NUMBER: 11-3.DWG

11-4



7 BLUE/BLACK WIRE

1 BLACK WIRE

RED WIRE FROM CONSOLE POWER

BLACK/WHITE/RED WIRE TO TB1

SPST SWITCH

LOCATED IN FRONT DASH PANEL

MEDTEC
A PIERCE COMPANY

SCALE: Fit

APPROVED BY:
Herman Mullet

DRAWN BY: SEB

DATE: B/20/02

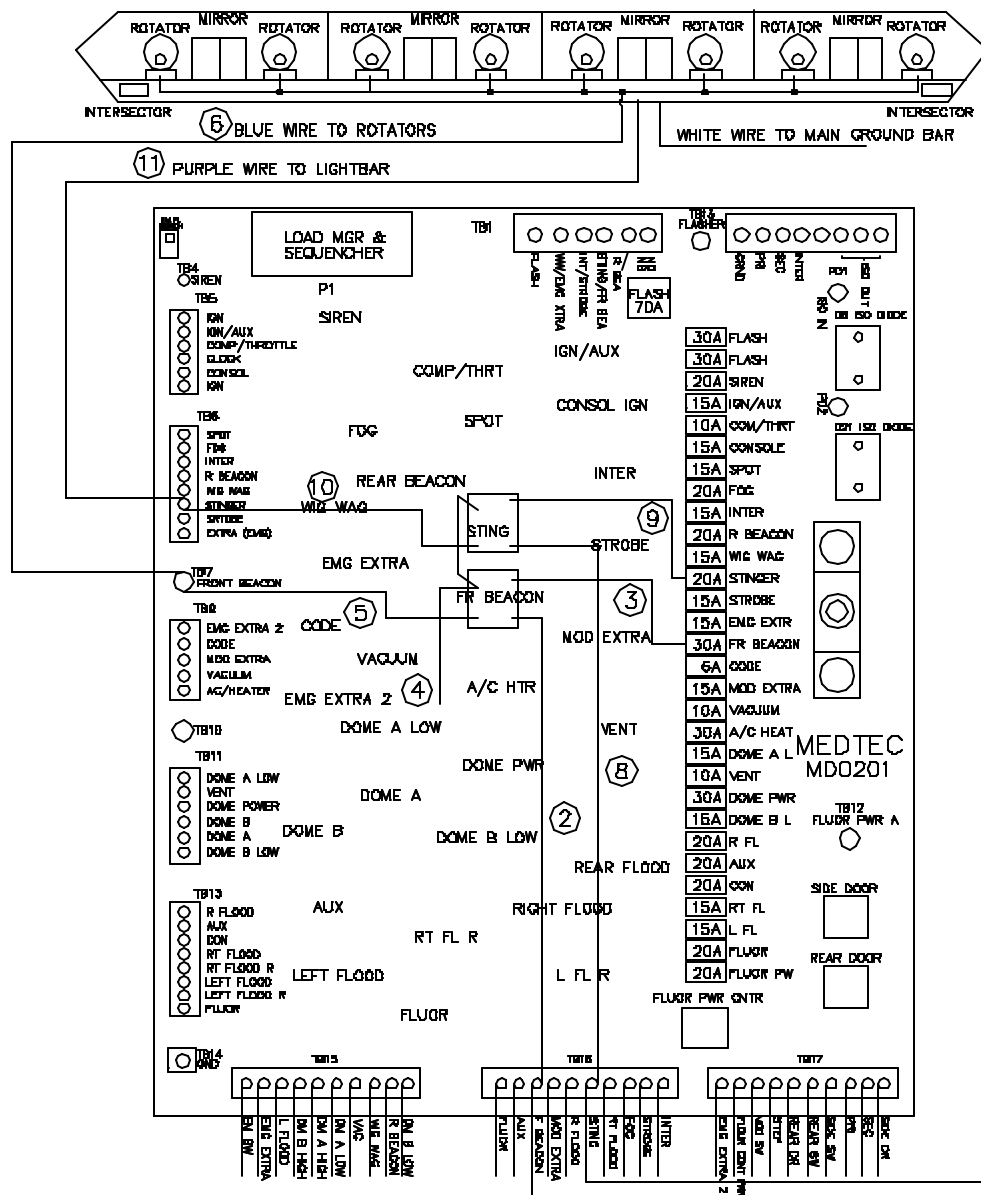
REVISÉD

PART NAME: Front Lightbar

MD0201

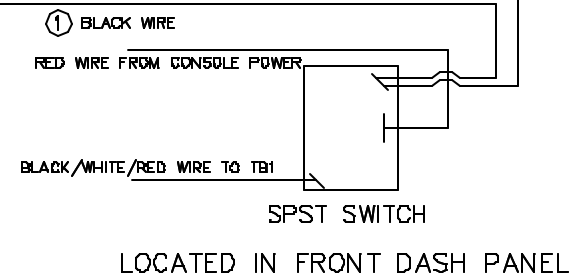
DRAWING NUMBER:
11-4.DWG

FRONT LIGHTBAR WITH INTERSECTORS



1. BLACK WIRE FROM SPST SWITCH TO TERMINAL F BEC "IN"
2. COPPER LEAD FROM TERMINAL F BEC "OUT" TO 40 AMP F BEC RELAY
3. COPPER LEAD FROM 30 AMP BREAKER TO 40 AMP F BEC RELAY
4. COPPER LEAD FROM 40 AMP F BEC RELAY TO GROUND THROUGH EMERGENCY SWITCH
5. COPPER LEAD FROM 40 AMP F BEC RELAY TO TERMINAL F BEC "OUT"
6. BLUE WIRE FROM TERMINAL F BEC "OUT" TO LIGHTBAR
7. BLUE/BLACK WIRE FROM SPST SWITCH TO TERMINAL STING "IN"
8. COPPER LEAD FROM TERMINAL STING "IN" TO 40 AMP STING RELAY
9. COPPER LEAD FROM 15 AMP BREAKER TO 40 AMP STING RELAY
10. COPPER LEAD FROM 40 AMP STING RELAY TO TERMINAL STING "OUT"
11. PURPLE WIRE FROM TERMINAL STING "OUT" TO STINGER

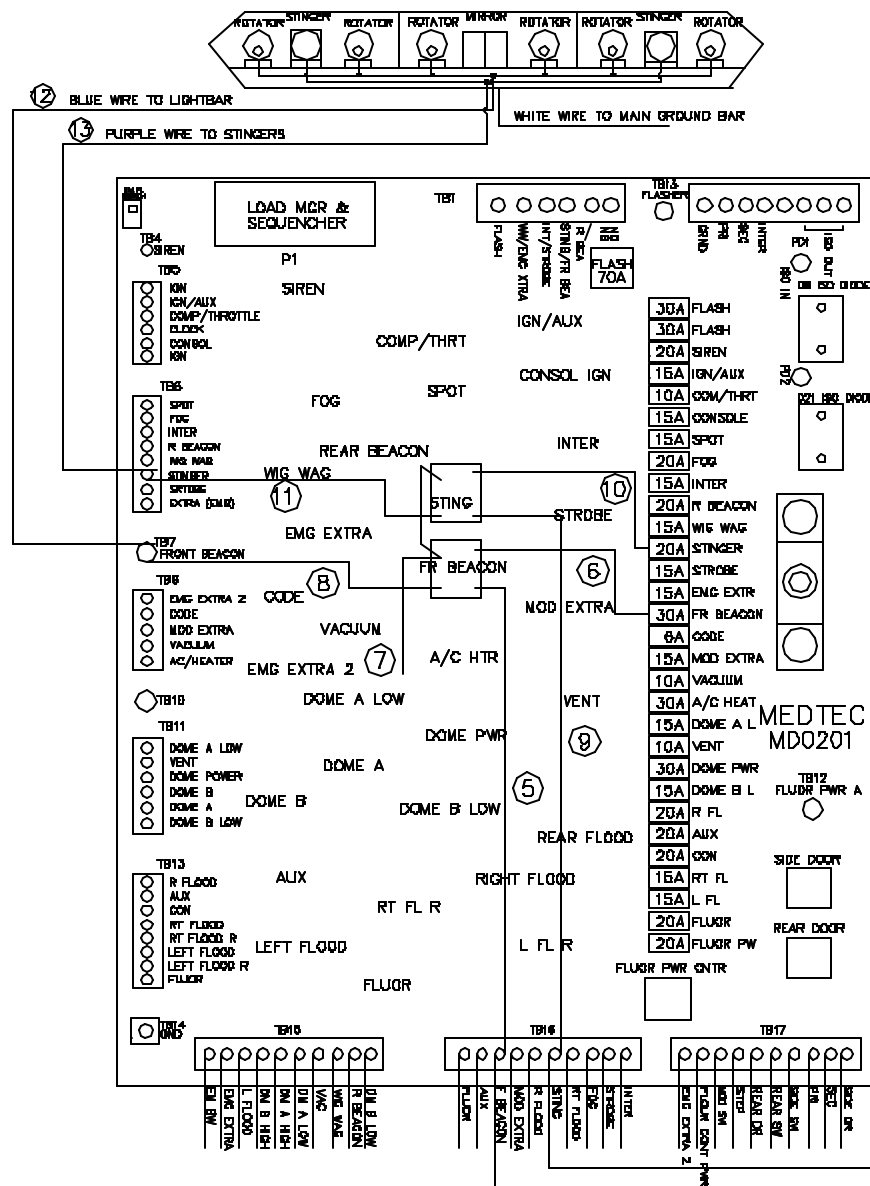
⑦ BLUE/BLACK WIRE



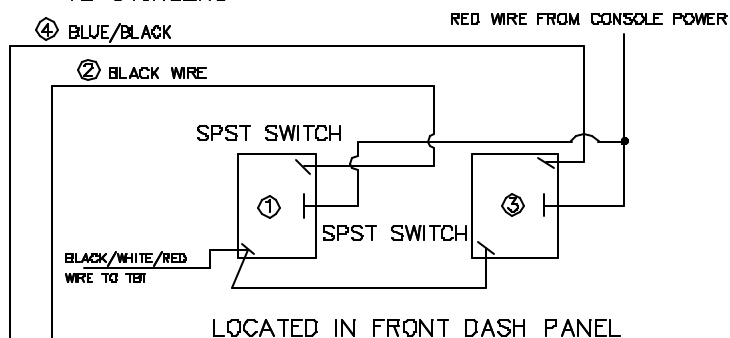
MEDTEC
A PIERCE COMPANY

SCALE: 1/16"	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED:
PART NAME: Front Lightbar With Intersectors		
MD0201		DRAWING NUMBER: 11-5.DWG

FRONT LIGHTBAR WITH STINGERS



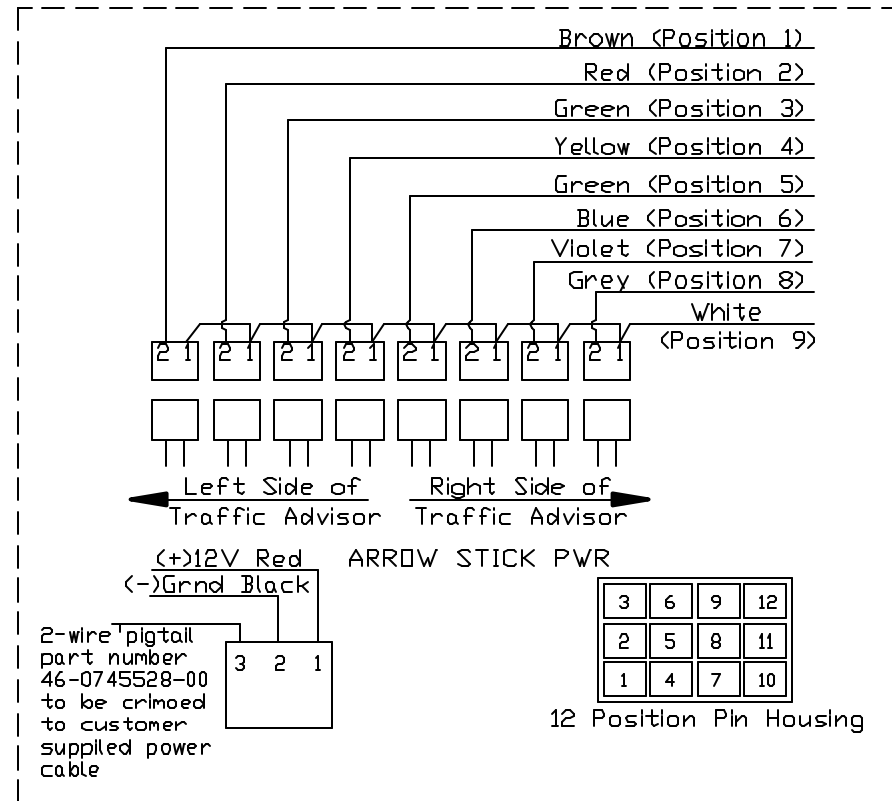
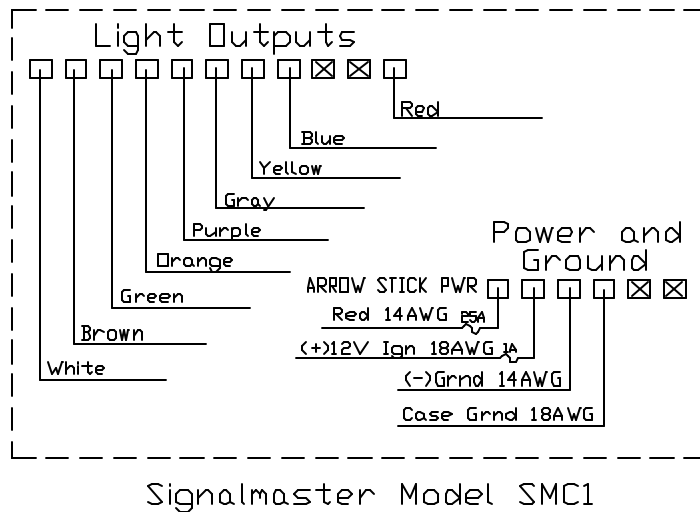
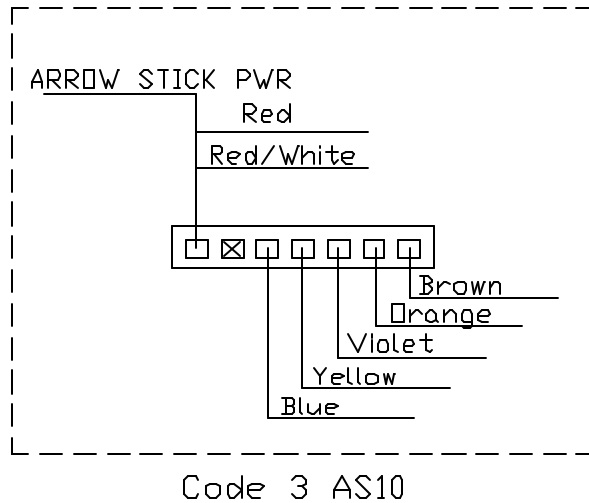
1. LIGHTBAR SPST SWITCH
2. BLACK WIRE FROM SPST #1 TO TERMINAL F BEC "IN"
3. STINGER SPST SWITCH
4. BLACK/WHITE WIRE FROM SPST #3 TO TERMINAL STING "IN"
5. COPPER LEAD FROM TERMINAL F BEC "IN" TO 40 AMP F BEC RELAY
6. COPPER LEAD FROM 30 AMP BREAKER TO 40 AMP F BEC RELAY
7. COPPER LEAD FROM 40 AMP F BEC RELAY AND 20 AMP STING RELAY TO GROUND THROUGH EMERGENCY SWITCH
8. COPPER LEAD FROM 40 AMP F BEC RELAY TO TERMINAL F BEC "OUT"
9. COPPER LEAD FROM TERMINAL STING "IN" TO 20 AMP STING RELAY
10. COPPER LEAD FROM 15 AMP BREAKER TO 20 AMP STING RELAY
11. COPPER LEAD FROM 20 AMP STING RELAY TO TERMINAL STING "OUT"
12. BLUE WIRE FROM TERMINAL F BEC "OUT" TO LIGHTBAR
13. PURPLE WIRE FROM TERMINAL STING "OUT" TO STINGERS



MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED:
PART NAME: Front Lightbar With Stinger		
MD0201		DRAWING NUMBER: 11-6.DWG

Arrow Stick Wiring



Whelen TA-836 Traffic Advisor

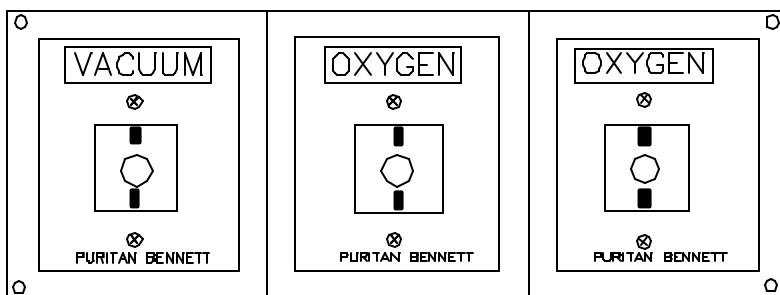
MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 2/20/02	REVISED:	
PART NAME: Arrow Stick Wiring		
		DRAWING NUMBER: 11-7.DWG

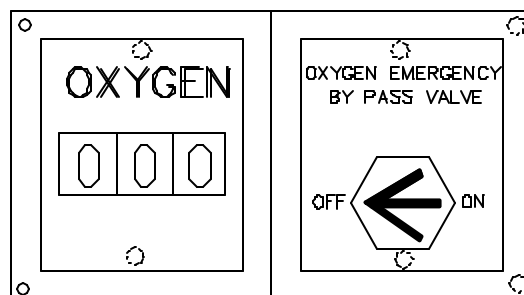
FRONT VIEW OF OUTLETS IN ACTION AREA

VACUUM OUTLET

OXYGEN OUTLETS

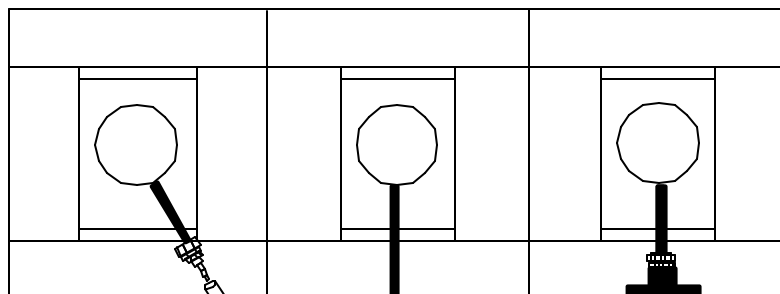


CONTENTS GAUGE MANUAL BYPASS



OPTIONAL

REAR VIEW OF OUTLETS



VACUUM LINE FROM E-12 VACUUM PUMP
TO VACUUM OUTLET IN ACTION AREA

GREEN CONDUCTIVE OXYGEN HOSE
FROM ACTION AREA OUTLETS TO
OPTIONAL OUTLETS

STANDARD
GREEN CONDUCTIVE OXYGEN HOSE
FROM OXYGEN TANK TO OUTLETS

3 WIRE SHIELDED CABLE FROM OXYGEN TANK
TO CONTENT GAUGE IN ACTION AREA

ELECTRIC ON/OFF VALVE
WITH MANUAL BYPASS

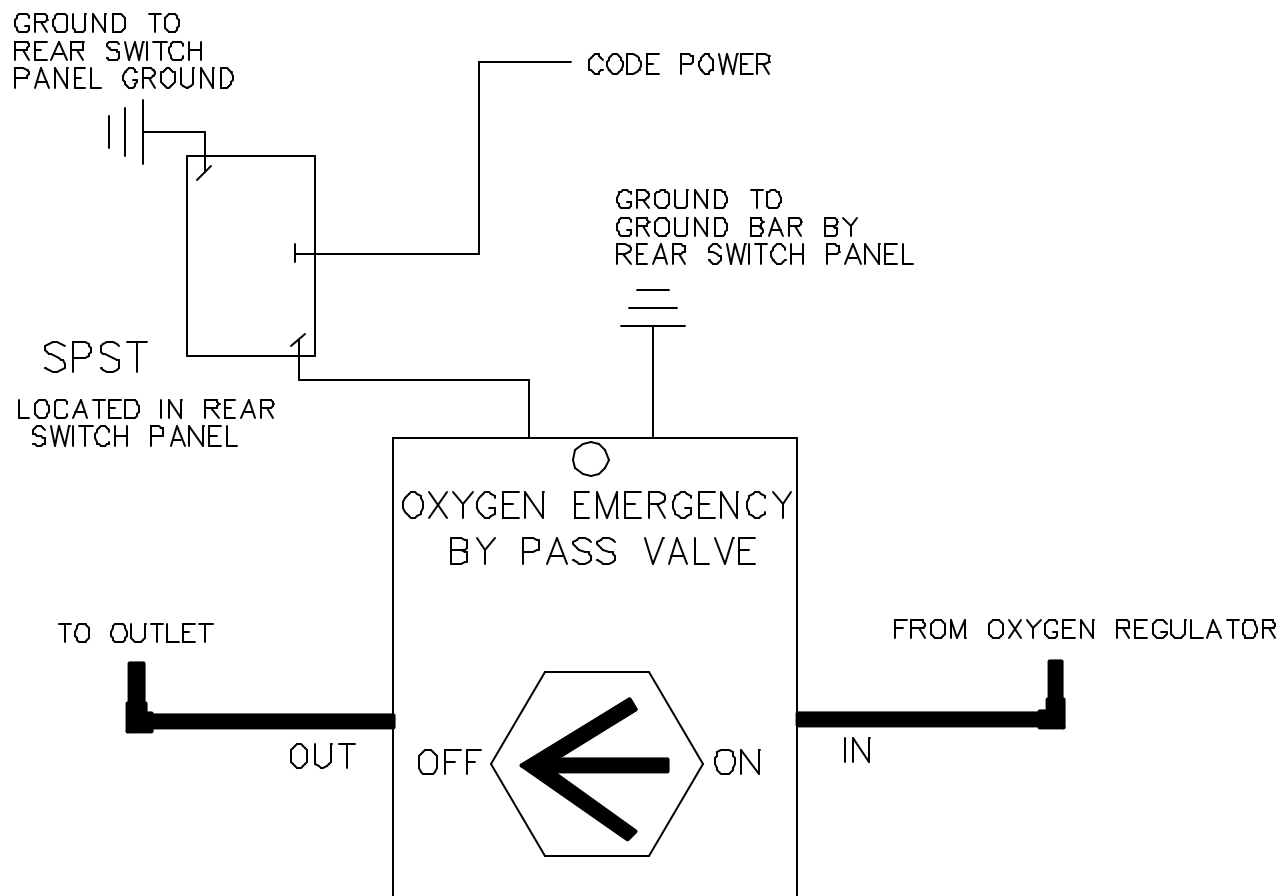
FROM
REGULATOR

POWER FROM CODE LIGHT
GROUND TO GROUND BAR

MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/19/99	Herman Mullet	REVISED:
PART NAME: Action Area Oxygen Outlets And Vacuum Outlets		
		DRAWING NUMBER: 12-1.DWG

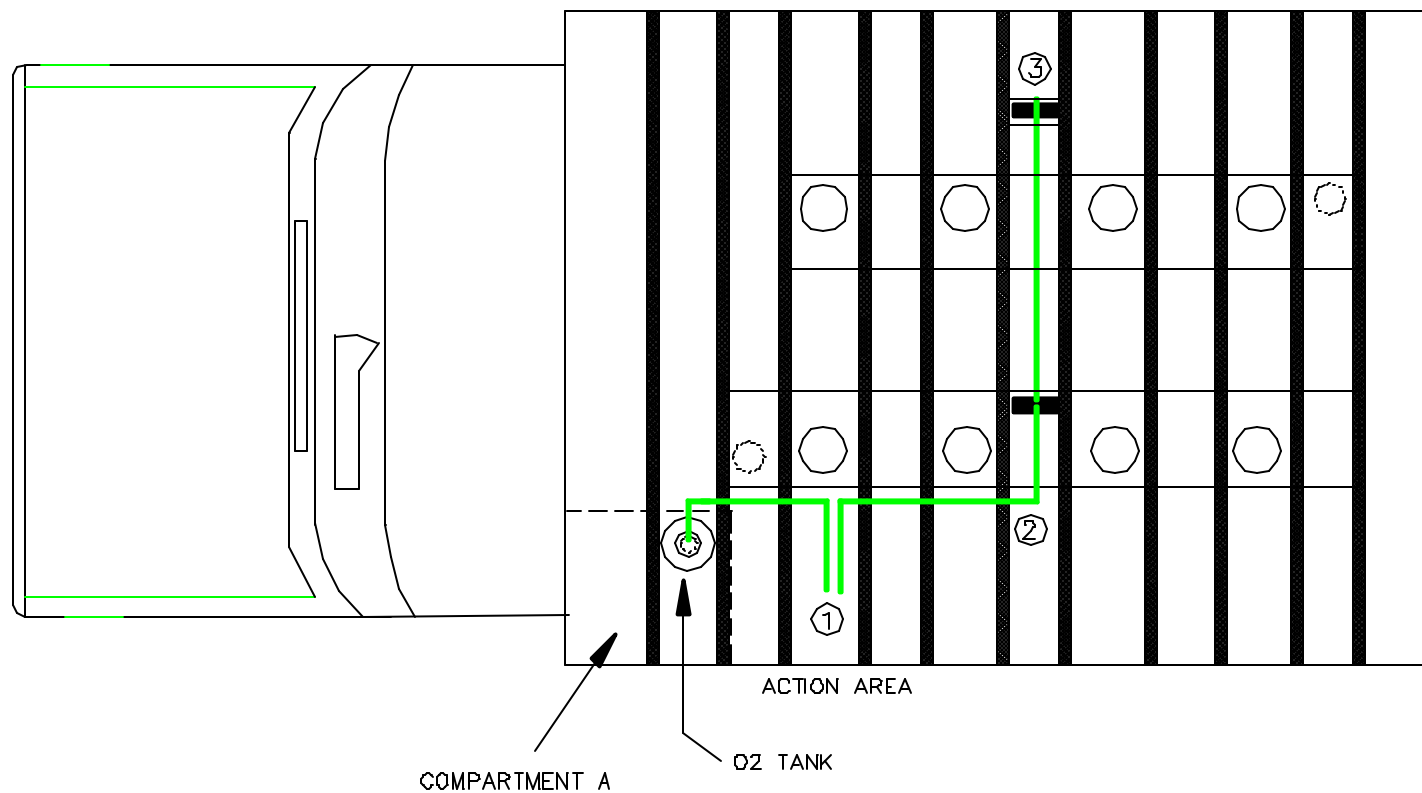
12-2



MEDTEC
A FIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: Electric Oxygen Module		
		DRAWING NUMBER: 12-2.DWG

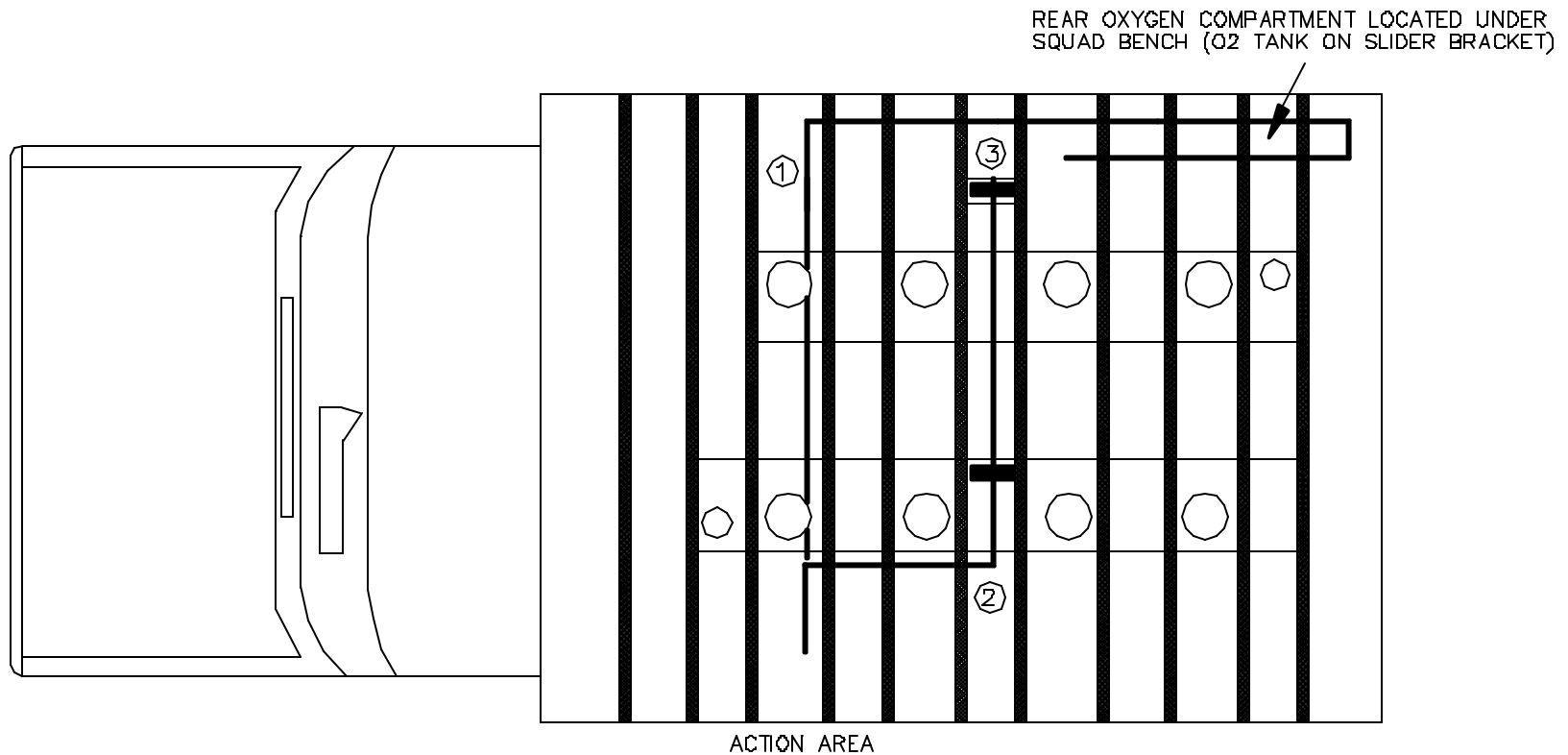
12-3



1. O2 HOSE RUN FROM O2 TANK TO OUTLETS IN ACTION AREA (2 OUTLETS STANDARD)
2. O2 HOSE RUN FROM ACTION AREA TO OPTIONAL OUTLET IN CEILING OVER COT
3. O2 HOSE RUN FROM O2 AT ACTION AREA TO OPTIONAL OUTLET OVER SQUAD BENCH

MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/19/99	Herman Mullet	REVISED:
PART NAME: Oxygen Hose Routing		
Models: Mod		DRAWING NUMBER: 12-3.DWG

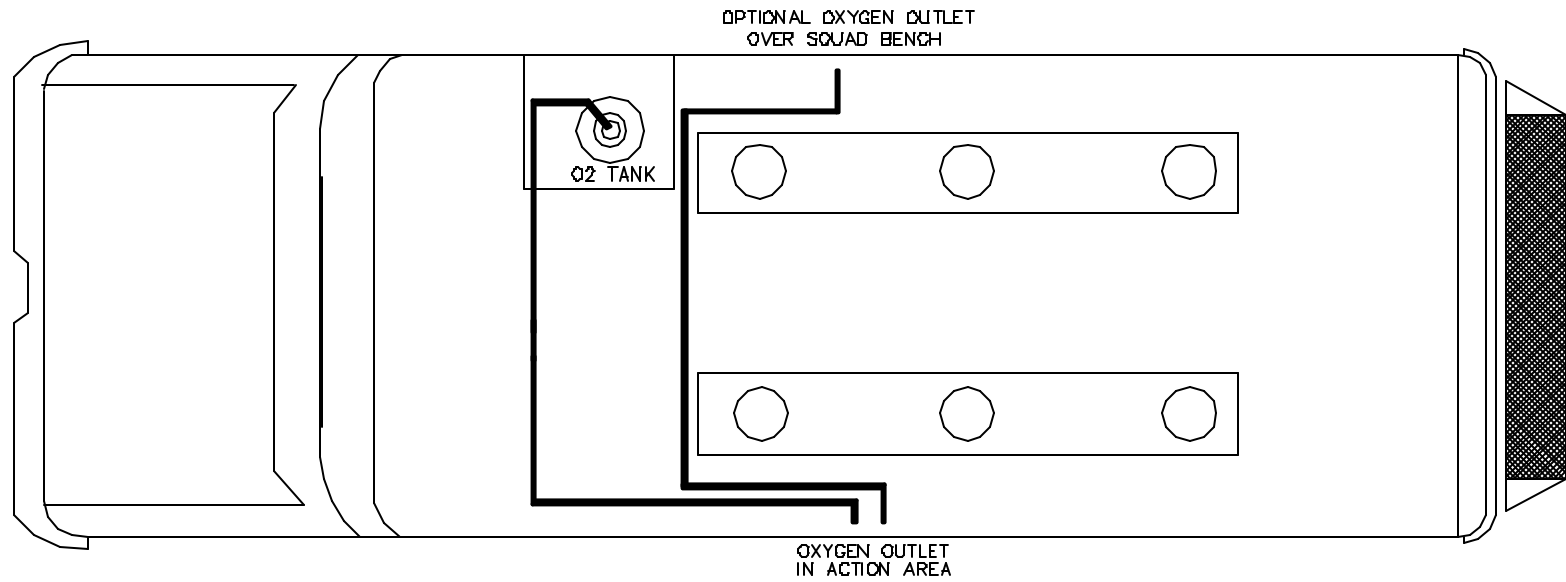
12-4



1. O2 HOSE RUN FROM O2 TANK TO OULETS IN ACTION AREA (2 OULETS STANDARD)
2. O2 HOSE RUN FROM ACTION AREA TO OPTIONAL OULET IN CEILING OVER COT
3. O2 HOSE RUN FROM ACTION AREA TO OPTIONAL OULET OVER SQUAD BENCH

MEDTEC A PIERCE COMPANY		
SCALE: Ft	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/19/99		REVISED:
PART NAME: Oxygen Hose Routing		
Models: Mod		DRAWING NUMBER: 12-4.DWG

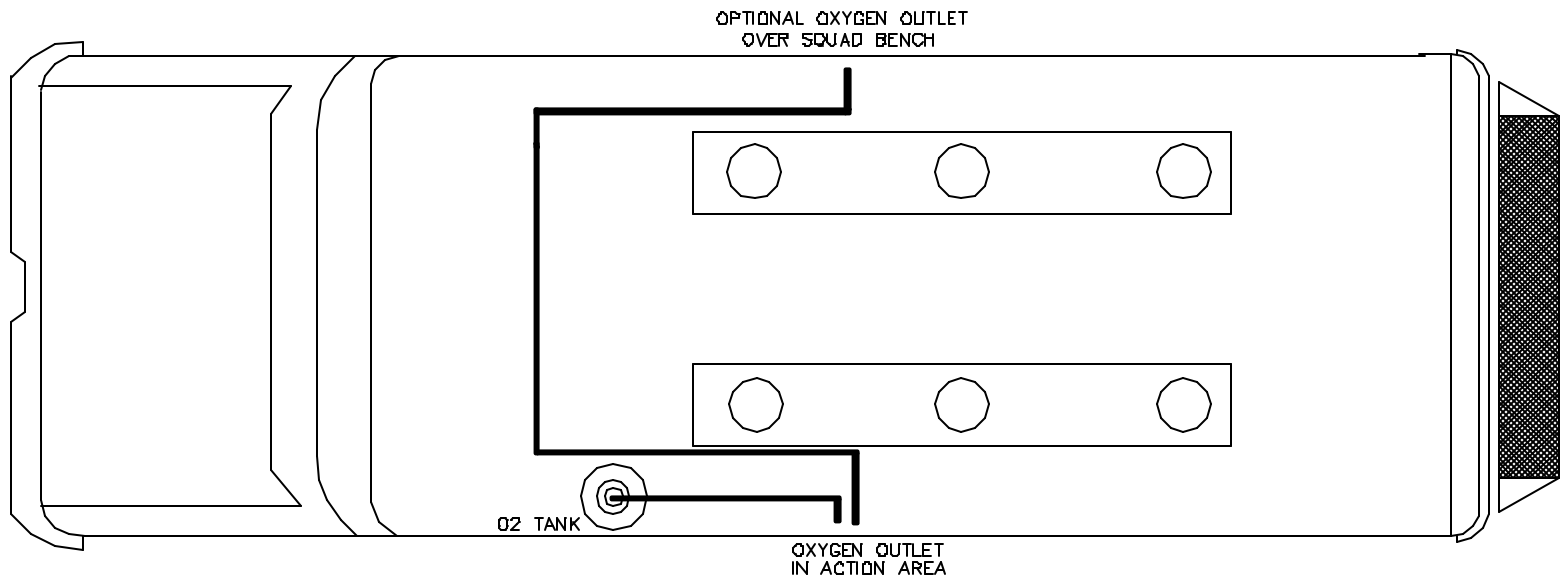
12-5



MEDTEC
A FERRIS COMPANY

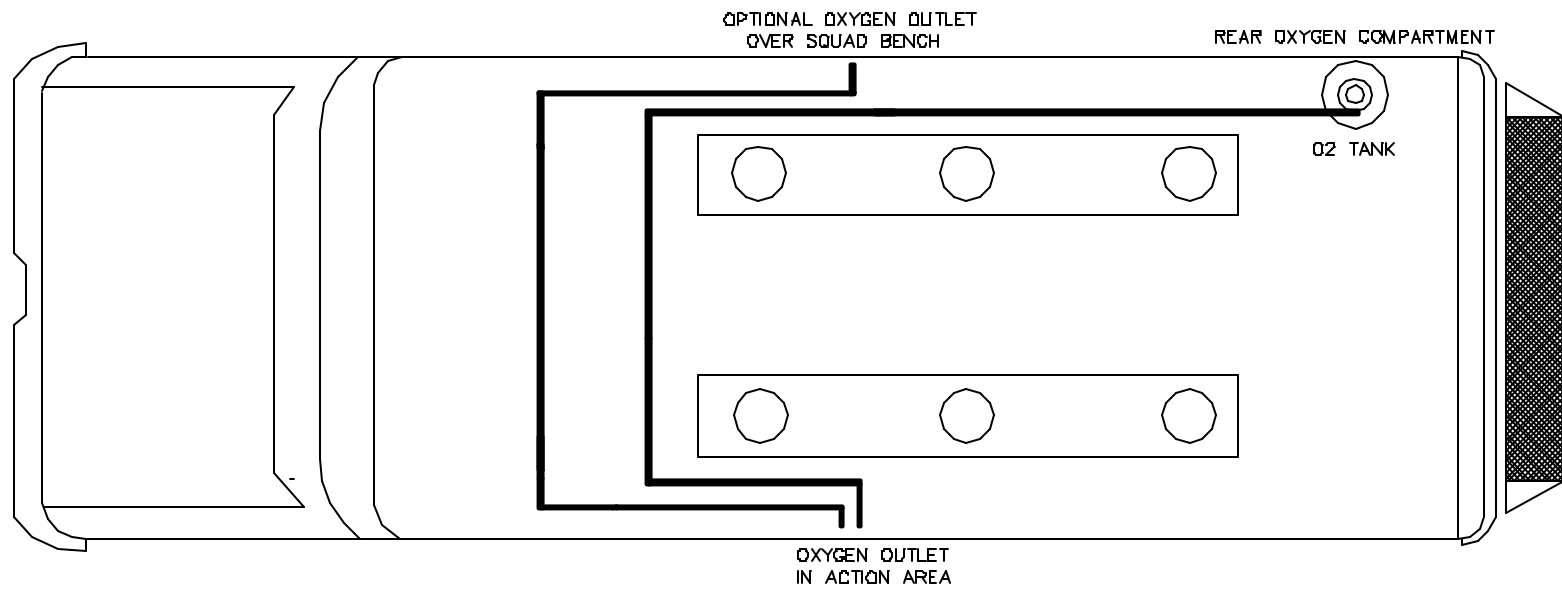
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/19/99		REVISED:
PART NAME: Van Stepwell Oxygen Tank		
		DRAWING NUMBER: 12-5.DWG

12-6

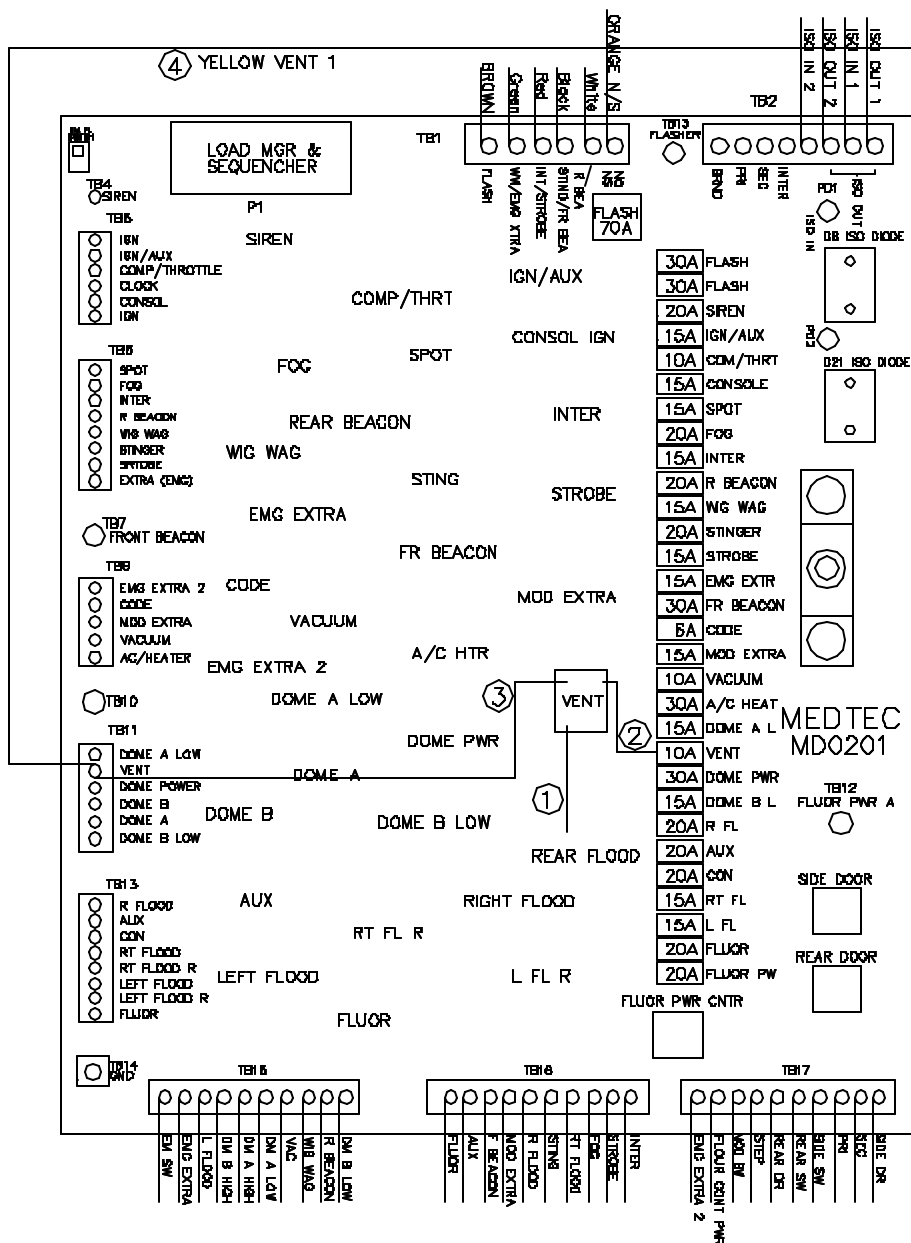


MEDTEC A PERINI COMPANY		
SCALE: F11	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/19/99		REVISED:
PART NAME: Van Action Area Oxygen Tank		
		DRAWING NUMBER: 12-6.DWG

12-7



MEDTEC A PERSEUS COMPANY		
SCALE: F14	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/19/99		REVISED:
PART NAME: Van Squad Bench Oxygen Tank		
		DRAWING NUMBER: 12-7.DWG



EXHAUST FAN

FAN SWITCH

FRONT

BACK

YELLOW VENT--Z

WHITE WIRE TO MAIN GROUND BAR

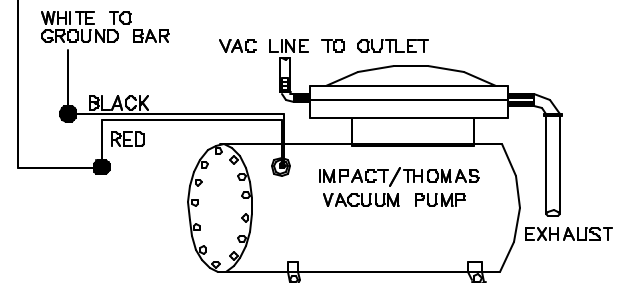
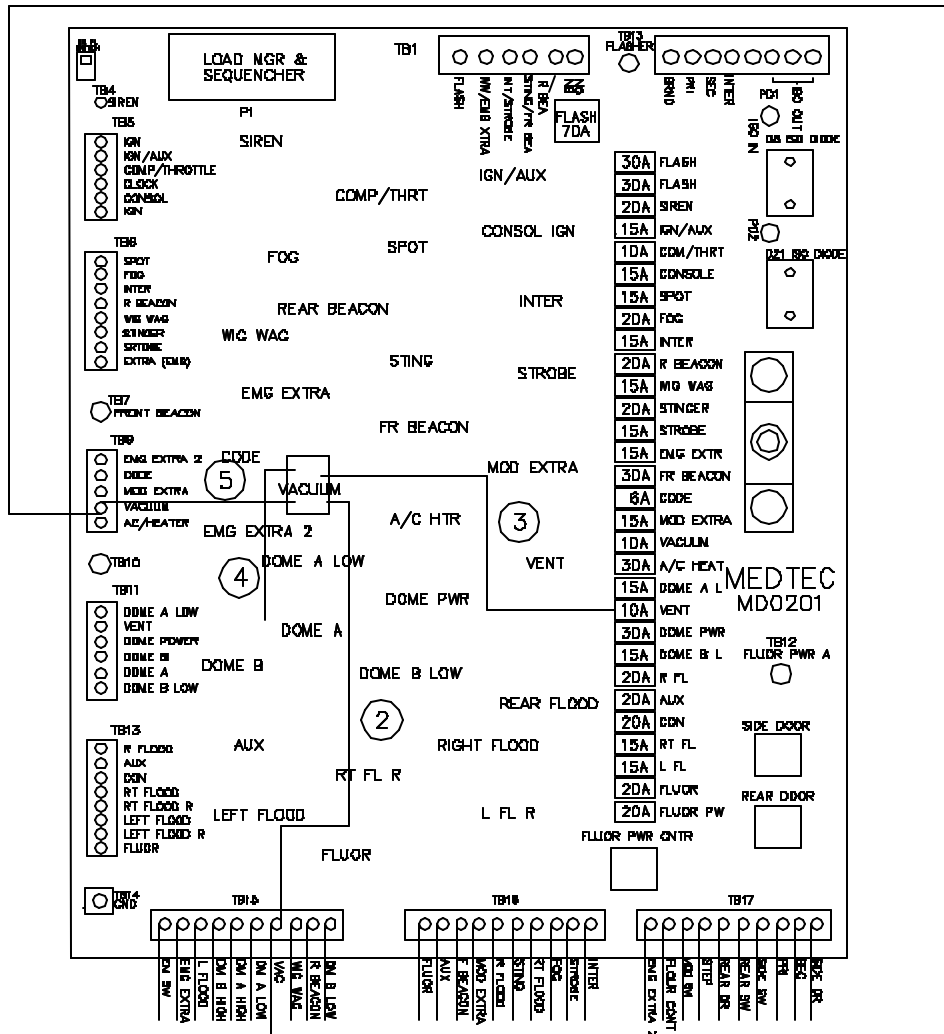
1. COPPER LEAD FROM 20 AMP VENT RELAY TO GROUND THROUGH MOD DISCONNECT
2. COPPER LEAD FROM 10 AMP BREAKER TO 20 AMP VENT RELAY
3. COPPER LEAD FROM 20 AMP VENT RELAY TO TERMINAL VENT "OUT"
4. YELLOW VENT 1 WIRE FROM TERMINAL VENT "OUT" TO EXHAUST FAN

MEDTEC
A PULSCO COMPANY

SCALE: 1ft	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED:
PART NAME: Detroit Marine Power Vent		
MD0201		DRAWING NUMBER: 13-1.DWG

1. BROWN WIRE FROM SPST SWITCH TO TERMINAL "IN"
2. COPPER LEAD FROM TERMINAL VAC "IN" TO 20 AMP VAC RELAY
3. COPPER LEAD FROM 15 AMP BREAKER TO 20 AMP VAC RELAY
4. COPPER LEAD FROM 20 AMP VAC RELAY TO GROUND THROUGH MOD DISCONNECT
5. COPPER LEAD FROM 20 AMP VAC RELAY TO TERMINAL VAC "OUT"
6. ORANGE VAC PUMP WIRE FROM TERMINAL VAC "OUT" TO VACUUM PUMP

⑥ ORANGE VAC PUMP WIRE



POWER COMES FROM CODE POWER

SPST SWITCH

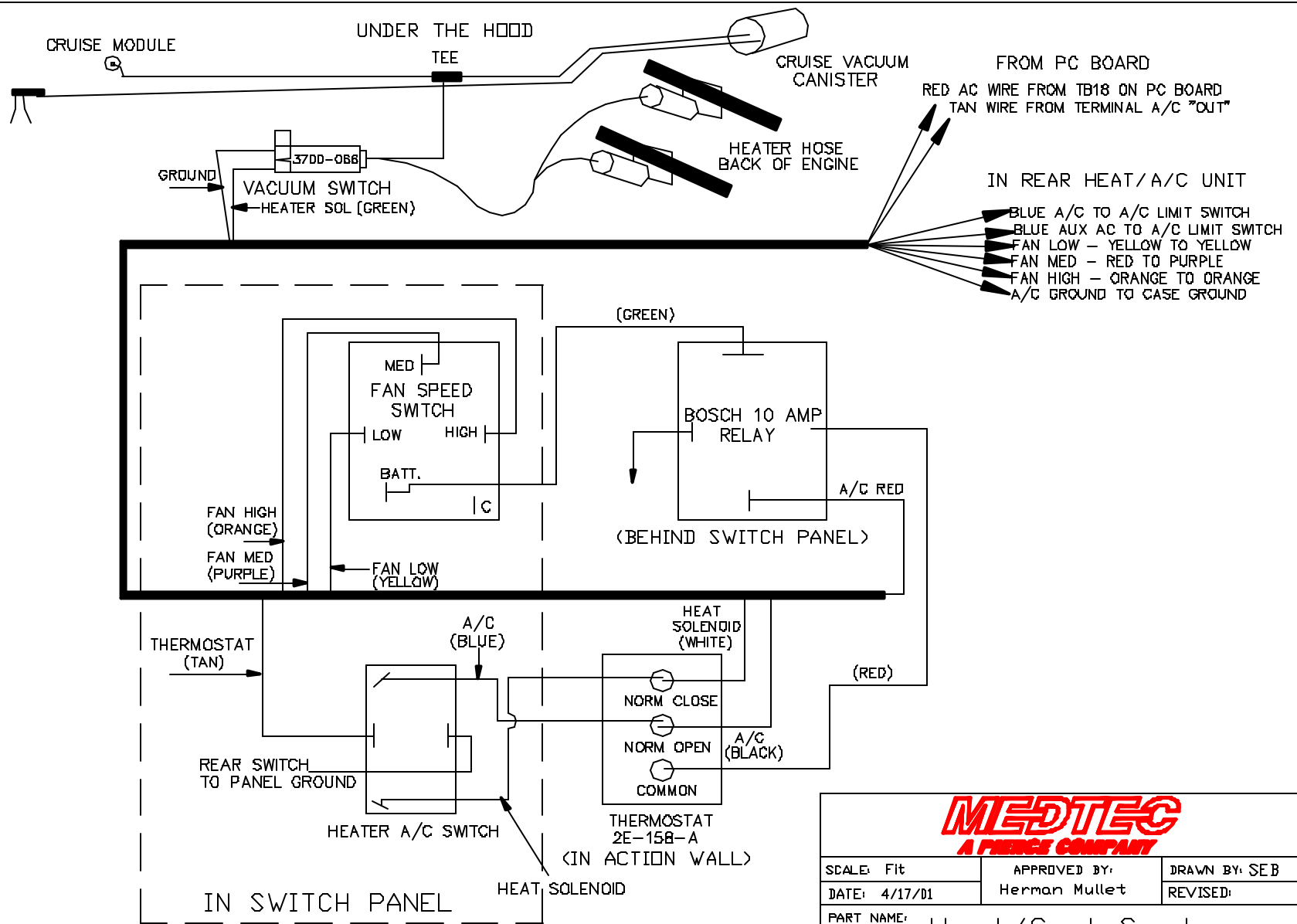
WHITE WIRE TO
MAIN GROUND BAR

① BROWN WIRE

MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME: Impact/Thomas Vacuum Pump		
MD0201		DRAWING NUMBER: 13-2.DWG

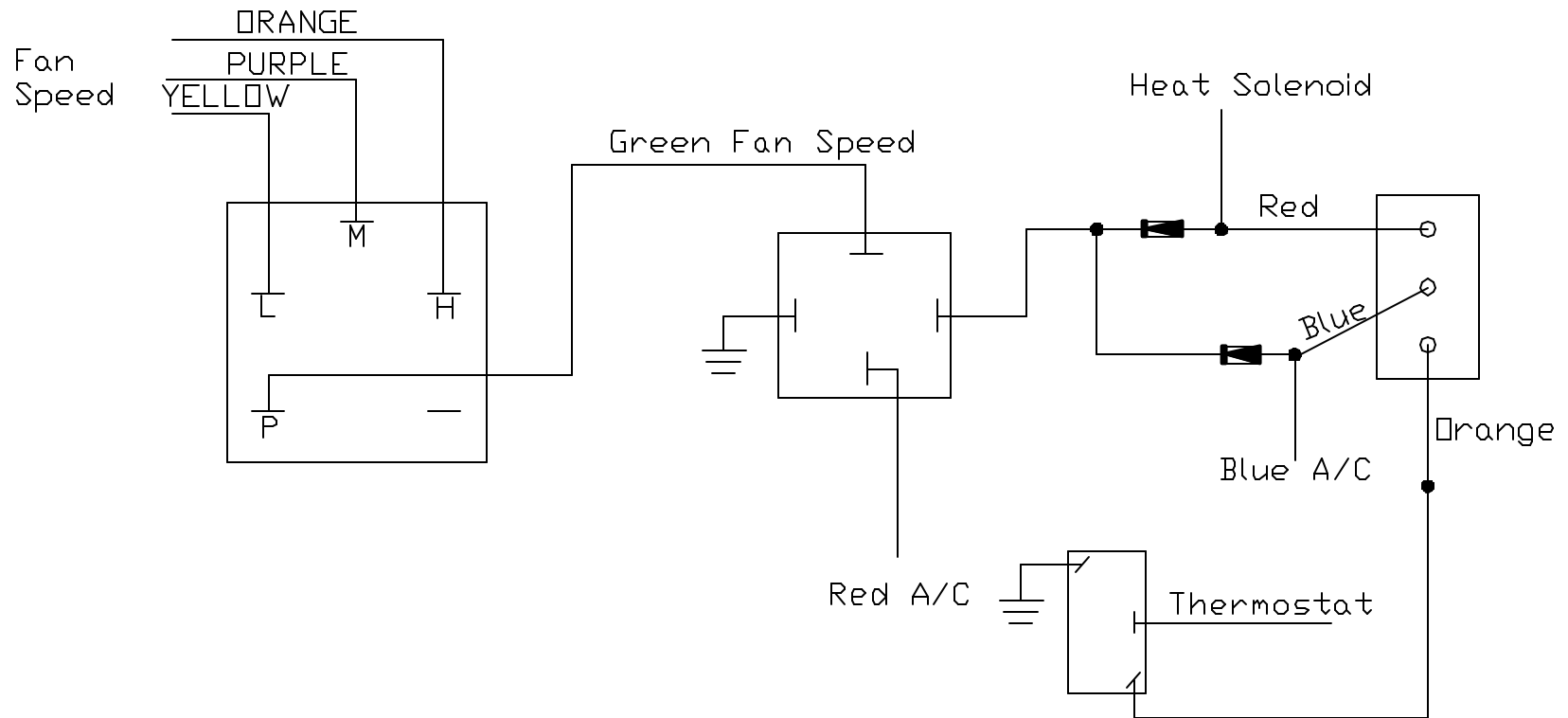
14-1



MEDTEC
A PERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Heat/Cool System		
Thermostat Control		DRAWING NUMBER: 14-1.DWG

14-2

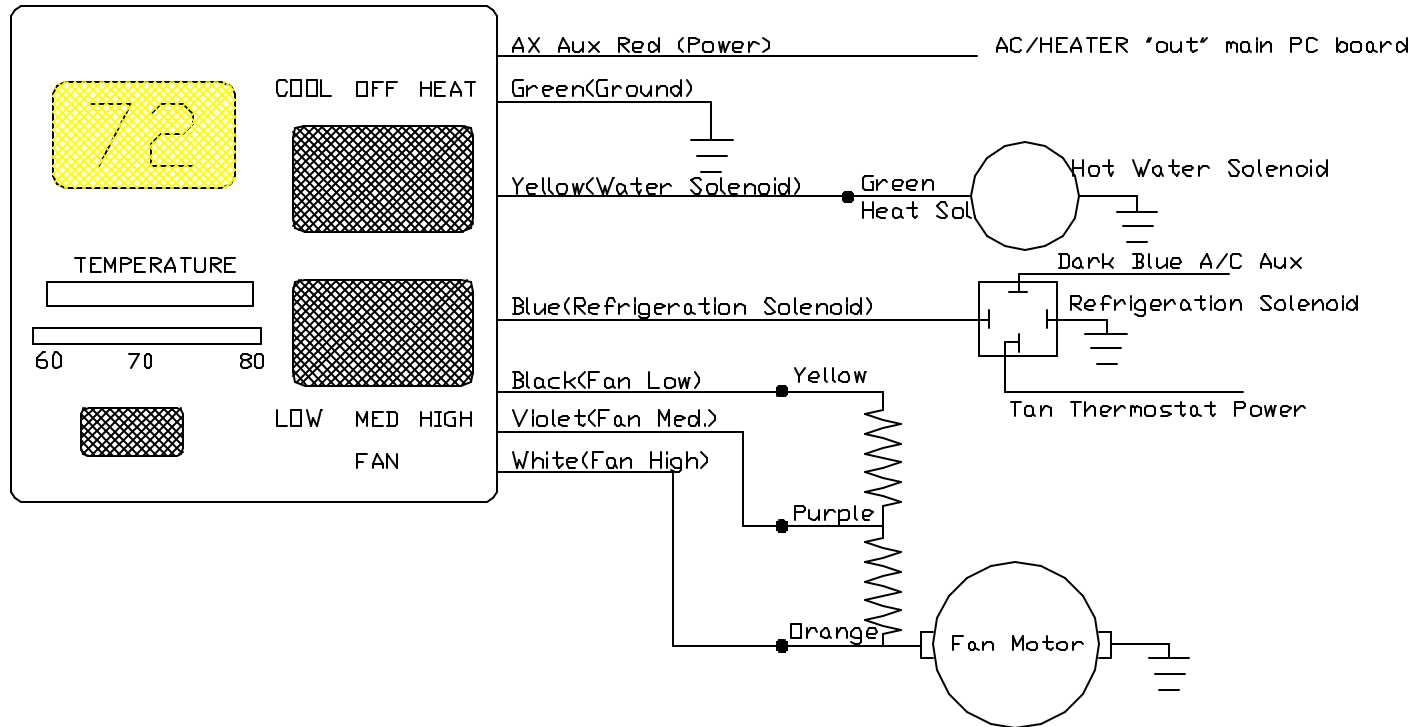


ACC: Auto Heat & Cool
with Fan Shut Off

MEDTEC
A PERSEUS COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: ACC Auto Thermostat		
		DRAWING NUMBER: 14-2.DWG

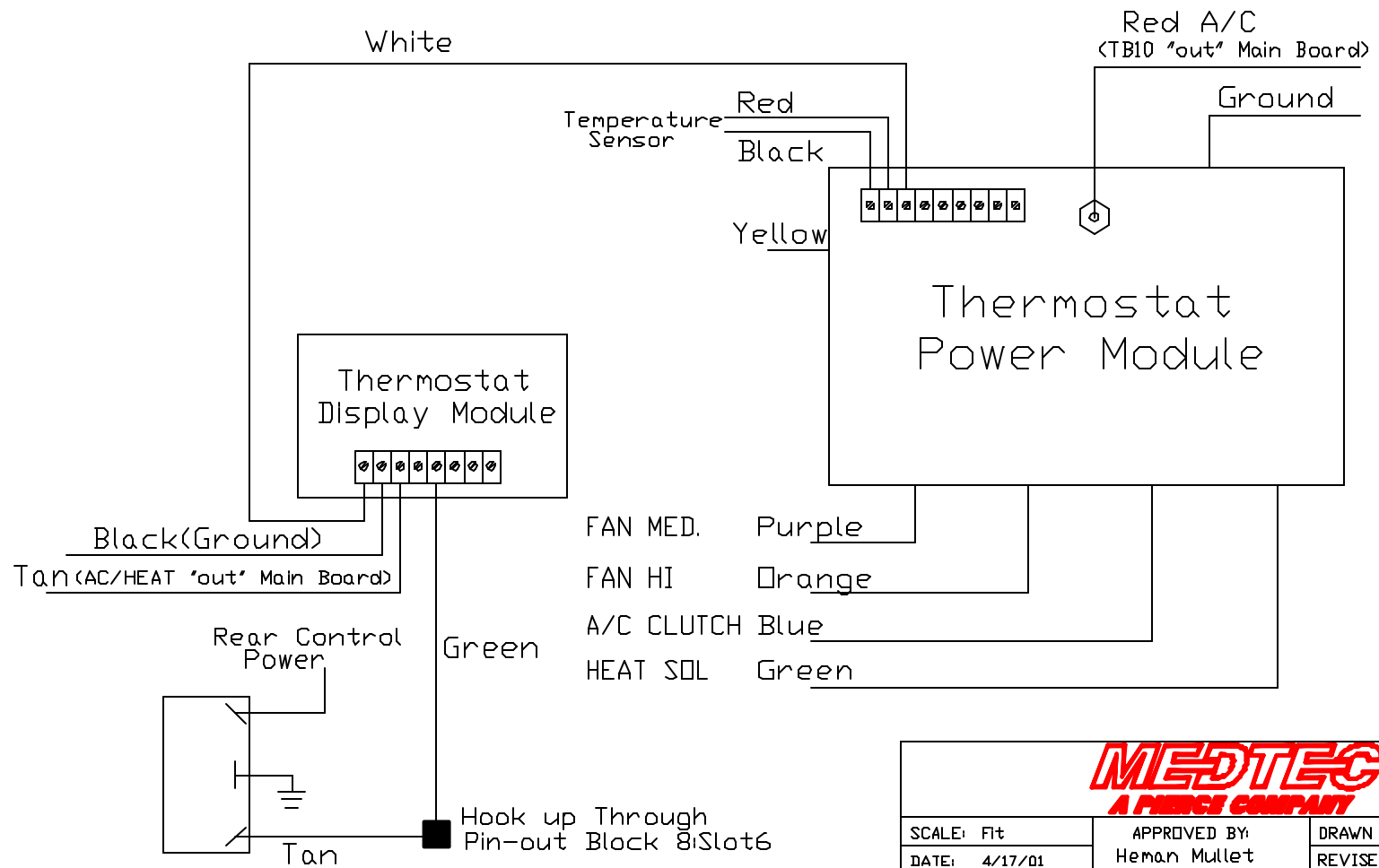
Climate Master CM-1000



MEDTEC
A PIERCE COMPANY

SCALE: Ft	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/19/99		REVISED:
PART NAME:	Climate Master CM-1000	
		DRAWING NUMBER 14-3.DWG

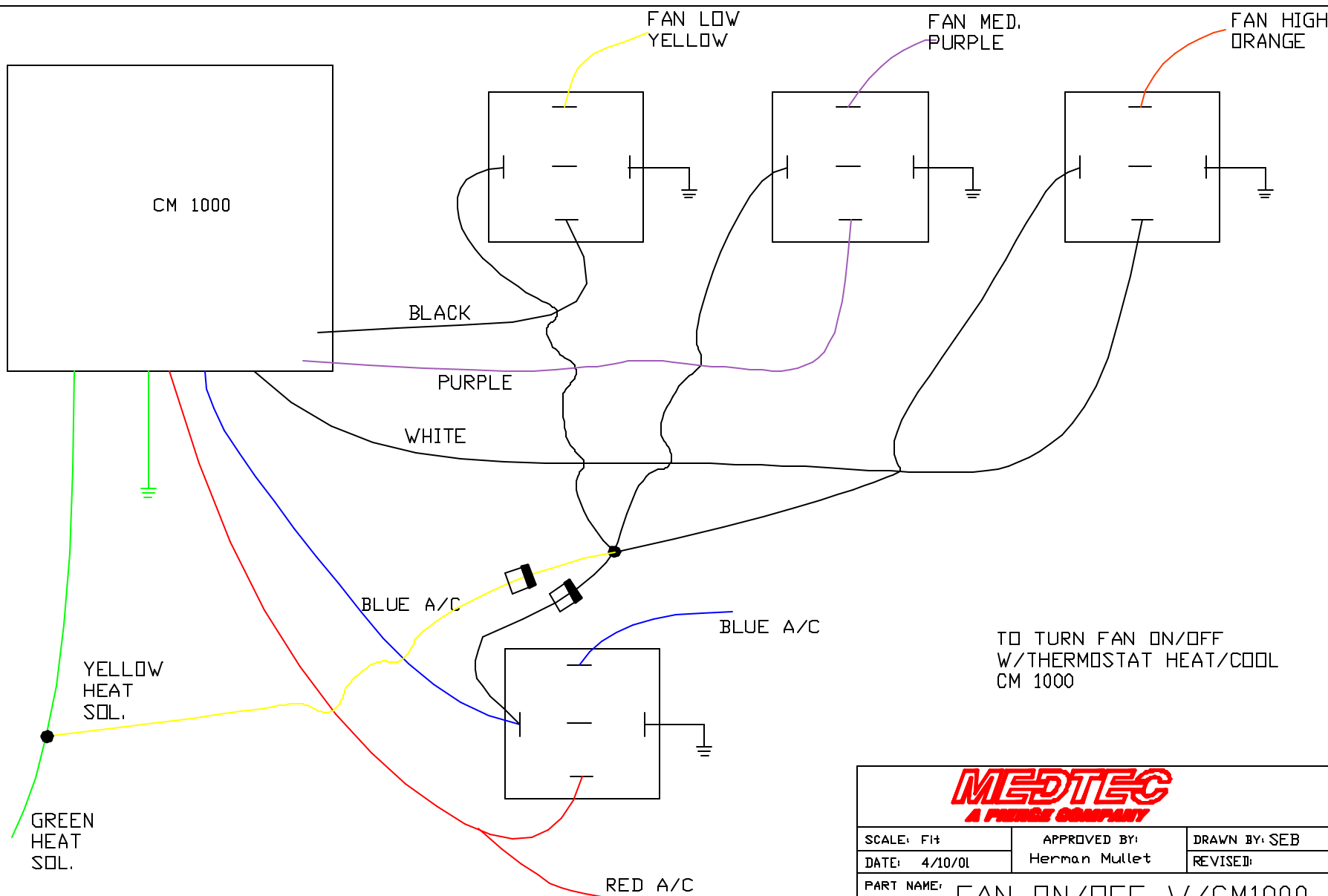
TSD 360-3010 Thermostat



MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Heman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: TSD Thermostat		
		DRAWING NUMBER: 14-4.DWG

14-5



MEDTEC
A FURCO COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/10/01	Herman Mullet	REVISED:
PART NAME: FAN ON/OFF W/CM1000		
		DRAWING NUMBER: 14-5.DWG



**A/C & Heating Units
and Hose Specialist**

HOSELINE, INC.
1619 Park Commerce Ct
St Cloud, FL 34769
407-892-2599
Fax 407-892-8143



**A/C & Heating Units
and Hose Specialist**

Thank you for your recent inquiry concerning our product line. We would like to discuss many of our features we feel are unique to our air conditioning and heating units.

The first feature we would like to mention is the design of an extended drain pan that is slanted for proper drainage and a removable blower assembly. This allows a field technician, by simply removing four (4) screws, to replace our ONE PIECE blower assembly. This blower assembly has dual wheels and a permanent magnet motor for longer life.

Our units carry a THREE (3) YEAR WARRANTY.

In addition to the above our copper tubing with aluminum fin heat cores have 32 passes and our copper tubing with aluminum fin air conditioning cores have 48 passes. The blower motor is 475 CFM at 0 static pressure and 13 amps at 4200 RPM. The A/C unit at 1" static pressure is 330 CFM and an amp draw of 10.98. There is 27,700 BTU for air conditioning and 55,000 BTU for heat in the newly designed super core unit. When using an external condenser there is 33,000 BTU for A/C. These tests were performed by independent laboratories and are available upon request. Our units have been through the Atlanta Testing Center and successfully passed all tests for KKK-A-1822D certification.

Your contact at the factory is William Grafton. If we can be of any help at any time, please feel free to call. We will be happy to discuss the details that will assure that both your immediate and long term vehicle environmental needs are fulfilled.



A/C & Heating Units
and Hose Specialist

HOSELINE, INC.
1619 Park Commerce Ct
St Cloud, FL 34769
407-892-2599
Fax 407-892-8143



A/C & Heating Units
and Hose Specialist

HOSELINE, INC.
WARRANTY

HOSELINE, INC. warrants each heater and air conditioner or its manufacture to be free from defects in workmanship and materials under normal use and operation for a period of three (3) years beginning with the date Hoseline, Inc. ships the product to Hoseline's immediate customer. This warranty is given only to Corporations or other businesses which are Hoseline, Inc.'s immediate customers and which purchase heaters and air conditioners for installation or resale.

This warranty shall not apply to any product which shall not have been installed in accordance with the manufacturer's instructions for installation and operation, nor to any products which have been repaired or altered outside of the manufacturer's factory in anyway, so as, in manufacturer's judgment to affect its stability, or reliability, nor which has been subject to misuse, negligence or accident. Nor shall Hoseline, Inc.'s warranty apply in case of accidental damage to the finish or components, abuse, misuse, flood, fire or if the serial number is missing, altered or defaced. Hoseline, Inc. is in no way responsible for labor charges or any loss of time, equipment rental or other expense incurred in the field, without authorization, nor for damages to persons or property resulting from the use of its products.

**LABOR CHARGES WILL NOT BE HONORED WITHOUT PRIOR WRITTEN
AUTHORIZATION FROM HOSELINE, INC. AND THE RETURN OF CLAIMED
DEFECTIVE PART. WARRANTY IS NULL AND VOID IF PROCEDURES ARE
NOT FOLLOWED.**

HOSELINE, Inc.'s obligations under this warranty are as follows: Upon return of unit Hoseline will repair or replace at no cost to original purchaser, material and/or workmanship determined to have been defective within the warranty period. Claims will be honored only upon determination that claim is covered by warranty and must be asserted by contacting:

HOSELINE, INC. 1619 Park Commerce Court St Cloud, FL 34769
PHONE: 407-892-2599 FAX 800-892-8143

NOTE: This warranty does not cover drive kit parts furnished by others.



SERVICE GUIDE FOR



HOSELINE, INC. AIR CONDITIONERS AND HEATING UNITS

INTRODUCTION

THIS GUIDE CONTAINS A DETAILED DISCUSSION OF BASIC AIR CONDITIONING SERVICING PROCEDURES AND PROBLEM SOLVING.
IT'S PURPOSE IS TO PROVIDE SERVICE PERSONNEL WITH THE NECESSARY FACTS TO SERVICE AND MAKE REPAIRS ON:

HOSELINE, INC. AIR CONDITIONERS AND/OR HEATERS.

KNOWING THE CONTENTS OF THIS GUIDE AND WHERE TO FIND THE INFORMATION WHEN YOU NEED IT; SHOULD SAVE TIME AND MAKE YOUR SERVICE PROBLEMS EASIER.

HOSELINE, INC.

1619 PARK COMMERCE COURT
ST. CLOUD, FL. 34769
407-892-2599 FAX 407-892-6143

GENERAL SERVICE INFORMATION

USE CARE WHEN DISCONNECTING OR CONNECTING REFRIGERANT LINES. ALWAYS USE A BACK-UP WRENCH AND BE CAREFUL NOT TO OVER-TIGHTEN.....ANY..... CONNECTION. OVER-TIGHTENING WILL RESULT IN SEAT DISTORTION AND A SYSTEM LEAK.

WHEN CLOSING THE GAUGE PORT, DO NOT OVER-TIGHTEN THE VALVE OR DAMAGE TO THE SEAT WILL RESULT.

AFTER DISCONNECTING GAUGE LINE, CHECK THE VALVE AREAS TO BE SURE SERVICE VALVES ARE SEATED CORRECTLY AND SCHRAEDER VALVES, IF USED, ARE NOT LEAKING.

EXERCISE SYSTEM

AN IMPORTANT FACT MOST AMBULANCE OWNERS IGNORE IS THAT A/C SYSTEMS MUST BE USED PERIODICALLY. AMBULANCE MANUFACTURERS CAUTION THAT WHEN THE AIR CONDITIONER IS NOT USED REGULARLY, PARTICULARLY DURING COLD MONTHS, IT SHOULD BE TURNED ON FOR A FEW MINUTES ONCE EVERY TWO OR THREE WEEKS WHILE THE ENGINE IS RUNNING. THIS KEEPS THE SYSTEM IN GOOD OPERATING CONDITION.

CHECKING OUT THE SYSTEM FOR THE EFFECTS OF DISUSE BEFORE THE ONSET OF SUMMER IS ONE OF THE MOST IMPORTANT ASPECTS OF A/C SYSTEM SERVICING.

FIRST CLEAN OUT THE CONDENSER CORE, MOUNTED IN ALL CASES AT THE FRONT OF THE TRUCKS RADIATOR. ALL OBSTRUCTIONS SUCH AS LEAVES, BUGS AND DIRT, MUST BE REMOVED AS THEY WILL REDUCE HEAT TRANSFER AND IMPAIR THE EFFICIENCY OF THE SYSTEM. MAKE SURE THE SPACE BETWEEN THE CONDENSER AND THE RADIATOR ALSO IS FREE OF FOREIGN MATTER. ALSO SOME AMBULANCES MAY HAVE A SECONDARY CONDENSER EITHER UNDER THE TRUCK OR FRONT OF BOX ABOVE CAB.

AMBULANCES HAVE TWO EVAPORATORS, ONE IN ENGINE COMPARTMENT AND ONE IN THE REAR. THE EVAPORATOR COOLS THE AIR BEFORE IT ENTERS THE TRUCK. THERE THE REFRIGERANT IS CHANGED FROM A LIQUID TO A VAPOR. AS THE CORE COOLS THE AIR, MOISTURE CONDENSES ON IT. HOWEVER, THE MOISTURE IS PREVENTED FROM COLLECTING IN THE EVAPORATOR BY THE DRAIN. MAKE CERTAIN BOTH EVAPORATOR DRAIN LINES ARE OPEN.

REFRIGERANT LINE RESTRICTIONS

1. A RESTRICTED SUCTION LINE IS INDICATED BY LOW SUCTION PRESSURE AT THE COMPRESSOR, LOW DISCHARGE PRESSURE AND LITTLE OR NO COOLING.
2. A RESTRICTED DISCHARGE LINE WILL USUALLY CAUSE THE PRESSURE RELIEF VALVE TO OPEN.
3. A RESTRICTED LIQUID LINE WILL CAUSE LOW SUCTION AND DISCHARGE PRESSURES AND LITTLE OR NO COOLING.

PRESSURE GAUGE INDICATIONS

DUE TO THE DIFFERENT TYPES OF MODELS AND SYSTEMS THE FOLLOWING TYPICAL PRESSURE GAUGE INDICATIONS SHOULD BE USED AS A GUIDE ONLY. REFER TO THE "PERFORMANCE TESTS" OR "SYSTEM PRESSURE CHECK" FOR THE PARTICULAR MODEL BEING TESTED. WHEN INDICATIONS OTHER THAN NORMAL ARE ENCOUNTERED, THESE TYPICAL INDICATION CHARTS WILL ASSIST IN DIAGNOSING THE REFRIGERANT SYSTEM. IT SHOULD BE NOTED THAT PRESSURES MAY VARY SLIGHTLY ABOVE OR BELOW DUE TO CHANGES IN AMBIENT TEMPERATURE AND RELATIVE HUMIDITY.

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ACHU1131L (SUPER CORE)

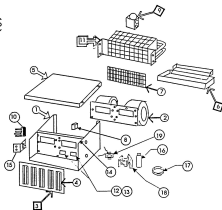
SPECIFICATIONS

BTU A/C : 27700

CFM: 475 (FREE AIR) RATING

BTU HEAT: DEPENDENT ON VEHICLE WATER PRESSURE
A RANGE OF 36,000 - 55,000+ BTU CAN BE OBTAINED.

(2)



ITEM	PART NO.	PART NAME	QTY.
1	1101P	BASIC BODY (50N)	1
2	BH1400-24	BLOWER MOTOR HOUSING	1
3	1100-3P	5 LOUVER FACE PLATE 10 1/2 X 20 LARGE	1
4	10-153-00 BEZEL	BEZEL LOUVER	5
5	1102P	COVER (LID TO UNIT)	1
6	1104-A&B	DRAIN PAN	1
7	LS740D64	UNIT SCREEN	1
8	R1061-30 THERMO	THERMOSTAT	1
9	EXV928	EXPANSION VALVE 2 TON	1
10	M916	RESISTOR	1
11	1131 EWAP SUP L	CORE	1
12		HOSELINE LABEL	1
13		SERIAL NUMBER LABEL	1
14	1100P	BLOWER MOUNTING PLATE	1
15	1105P	RESISTOR CLIP	1
16	7-9125	DRYER	1
17	CLAMP	# 36 HOSE CLAMP	1
18	1106P	DRYER BRACKET	1
19	GM103	SOLENOID	1



NOTE: ITEMS 16 AND 19 OPTIONAL



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RECOMMENDED INSTALLATION INSTRUCTIONS



IMPORTANT

INSULATION NEEDS TO BE INSTALLED AROUND THE HOLE WHERE THE A/C UNIT IS TO BE INSTALLED. MOUNTING SHOULD BE FLUSH AND AIR SHOULD FLOW OUT FROM THE FRONT OF THE UNIT. NO AIR SHALL FLOW BACK UNDER, ON TOP OR THE SIDES OF THE UNIT.

1/4 INCH SQUARE MOUNTING BOARD



3/8 INCH SQUARE MOUNTING BOARD

IT IS DESIRABLE TO USE MOUNTING BOARDS INSTALLED UNDER THE FRONT AND BACK EDGE OF THE A/C UNIT. THE BOARDS SHOULD BE THE SAME WIDTH AS THE A/C UNIT.

THE BOARDS ARE USED TO GIVE THE A/C UNIT THE CORRECT ANGLE FOR PROPER DRAINAGE.

SIDE VIEW OF AMBULANCE COMPARTMENT WHERE AIR CONDITIONING UNIT IS MOUNTED.

DRAIN HOSE



DRAIN HOSE

AMBULANCE COMPARTMENT WHERE A/C UNIT IS MOUNTED. THIS VIEW SHOWS THE DRAIN HOSE ROUTING.

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THERMOSTATIC SWITCH
(R1061-30)

WIRING DIAGRAM FOR MODELS: ACHU: 1103, 1106, 1118, 1131.



BLUE = BATTERY

BLUE = CLUTCH OR
SOLENOID

(ORANGE)

RESISTOR
(M916)

ORANGE = HIGH

YELLOW = LOW

RED = MED

WIRES TO
3 SPEED
BLOWER SWITCH
(M5H754)

(ORANGE)

GROUNDED TO CASE

(BLACK)

BLOWER MOTOR
(BH1400)

(4)

NOTES: (1) IF YOUR VEHICLE DOES NOT HAVE A GM103. RUN THE
BLUE WIRE TO THE COMPRESSOR.(2) IF YOUR VEHICLE HAS A GM103. CONNECT THE BLUE WIRE
TO ONE WIRE ON THE GM103 AND THE OTHER WIRE FROM
THE GM103 TO THE COMPRESSOR.

(3) RUN GROUND WIRE TO CASE OF UNIT.

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ACHU1100L (U1100L BASIC UNIT)

NOTE: THE UNIT DEPICTED IS A U1100L. THE UNIT CAN BE BOUGHT AS U1100R. THIS IS DETERMINED BY WHICH SIDE THAT THE HOSE CONNECTIONS ARE MADE TO THE UNIT.



NOTE: THE HOSELINE LABEL AND SERIAL NUMBER IS LOCATED ON THE FRONT SIDE OF THE BLOWER MOTOR MOUNTING PLATE.

NOTE: THE BEZEL LOUVER FACE PLATE IS DRAWN AS VIEWED FROM THE FRONT OF THE UNIT.

BEZEL LOUVER (BLACK)
(152-HS/233HS)

DECAL (CT40000)

(1102P)
LID TO UNIT

(1100-1P) FACE PLATE
4 EVR

(M916)
RESISTOR

(1105P)
RESISTOR CLIP

NOTE: RESISTOR CLIP AND
RESISTOR ARE MOUNTED ON
THE FRONT SIDE OF THE BLOWER
MOTOR MOUNTING PLATE

(1100P)
BLOWER MOTOR
MOUNTING PLATE

(1100 EVAP COR L)
CORE (1100LEC)

(BH1400A)
BLOWER MOTOR
AND FAN CAGE

UNIT SCREEN (152A/045)

(EXV928)
EXP VALVE 2 TON

NOTE: A DRYER MAY ALSO BE
PROVIDED.

DRYER BRACKET (1106P)
DRYER (7-9125)

ADDITIONAL PROVIDED PARTS

1. CABLE - (7036 3223)
2. 3 SPEED SWITCH - (MSH754)
3. THERMOSTATIC SWITCH
(R1033-30)
4. HEATER WATER VALVE
(2211)
5. SWITCH KNOB (KH11208L)

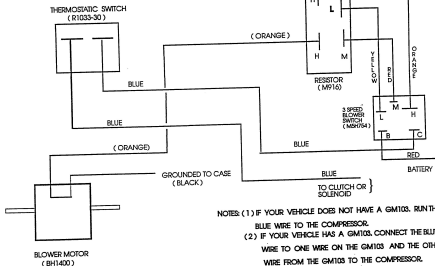
(1101P)
BASIC BODY

(1104-A&BP)
(5) DRAIN PAN

U1100L COR
1A-5/29/96

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WIRING DIAGRAM FOR MODEL ACHU 1100



- NOTES: (1) IF YOUR VEHICLE DOES NOT HAVE A GM103, RUN THE BLUE WIRE TO THE COMPRESSOR.
(2) IF YOUR VEHICLE HAS A GM103, CONNECT THE BLUE WIRE TO ONE WIRE ON THE GM103 AND THE OTHER WIRE FROM THE GM103 TO THE COMPRESSOR.
(3) RUN GROUND WIRE TO CASE OF UNIT.

DISCHARGING SYSTEM

R-134A SYSTEMS REQUIRE THE USE OF SPECIAL EQUIPMENT DESIGNED SPECIFICALLY FOR 134A SYSTEMS. R-12 SERVICING EQUIPMENT CANNOT BE USED ON R-134A SYSTEMS.

REFRIGERANT-12 RECOVERY STATIONS CANNOT BE USED ON REFRIGERANT-134A SYSTEMS. A SEPARATE RECOVERY STATION MUST BE USED ON R-134A SYSTEMS. THE REFRIGERANTS ARE NOT COMPATIBLE AND WILL CONTAMINATE THE R-12 RECOVERY STATION. THE USE OF REFRIGERANT RECOVERY AND RECYCLING STATIONS ALLOWS THE RECOVERY AND REUSE OF REFRIGERANT AFTER CONTAMINANTS AND MOISTURE HAVE BEEN REMOVED.

WHEN USING A RECOVERY OR RECYCLING STATION, FOLLOW THE MANUFACTURER'S OPERATING INSTRUCTIONS. NOTE THE FOLLOWING:

1. USE EXTREME CAUTION AND OBSERVE ALL SAFETY AND SERVICE PRECAUTIONS RELATED

TO THE USE OF REFRIGERANTS.

2. CONNECT REFRIGERANT RECYCLING STATION HOSES TO VEHICLE A/C SERVICE PORTS AND RECOVERY STATION INLET FITTING. HOSES USED SHOULD HAVE SHUTOFF DEVICES OR A CHECK VALVE WITHIN 12 INCHES OF HOSE ENDS TO MINIMIZE INTRODUCTION OF AIR INTO RECYCLING STATION AND TO MINIMIZE AMOUNT OF REFRIGERANT RELEASE WHEN HOSES ARE DISCONNECTED.
3. TURN RECYCLING STATION ON TO START RECOVERY PROCESS. ALLOW RECYCLING STATION TO PUMP REFRIGERANT FROM A/C SYSTEM UNTIL STATION PRESSURE GAUGE INDICATES VACUUM.
4. AFTER VEHICLE A/C SYSTEM HAS BEEN EVACUATED, CLOSE STATION INLET VALVE, IF EQUIPPED.
5. TURN STATION OFF. ON SOME STATIONS THE PUMP WILL AUTOMATICALLY BE TURNED OFF BY A LOW PRESSURE SWITCH.
6. ALLOW VEHICLE A/C SYSTEM TO REMAIN CLOSED FOR APPROXIMATELY TWO MINUTES AND OBSERVE VACUUM LEVEL INDICATED ON GAUGE. IF PRESSURE DOES NOT RISE, DISCONNECT RECYCLING STATION HOSES.
7. IF SYSTEM PRESSURE RISES, REPEAT STEPS 3 THROUGH 6 UNTIL VACUUM LEVEL REMAINS STABLE FOR TWO MINUTES.
8. SERVICE A/C SYSTEM AS NECESSARY, THEN EVACUATE AND RECHARGE A/C SYSTEM.

EVACUATE SYSTEM WITH VACUUM PUMP

VACUUM PUMPS SUITABLE FOR REMOVING AIR AND MOISTURE FROM A/C SYSTEMS ARE COMMERCIALY AVAILABLE. A SPECIFICATION FOR SYSTEM PUMPDOWN USED HERE IS 28- 29 1/2 INCHES VACUUM. THIS READING CAN BE ATTAINED AT OR NEAR SEA LEVEL ONLY. FOR EACH 1000 FEET OF ALTITUDE THIS OPERATION IS PERFORMED, THE READING WILL BE 1 INCH VACUUM HIGHER. EXAMPLE: AT 5000 FEET, ONLY 23 - 23 1/2 INCHES OF VACUUM CAN BE OBTAINED.

THE SYSTEM MUST BE COMPLETELY DISCHARGED BEFORE IT CAN BE EVACUATED. DAMAGE TO THE VACUUM PUMP WILL RESULT IF PRESSURIZED REFRIGERANT IS ALLOWED TO ENTER.

1. CONNECT VACUUM PUMP TO GAUGE MANIFOLD. WITH GAUGES CONNECTED INTO SYSTEM, REMOVE CAP FROM VACUUM HOSE CONNECTOR, INSTALL CENTER HOSE FROM GAUGE MANIFOLD TO VACUUM PUMP CONNECTOR. MIDPOSITION HIGH AND LOW SIDE COMPRESSOR SERVICE VALVE. OPEN HIGH AND LOW SIDE GAUGE MANIFOLD HAND VALVES.
2. OPERATE VACUUM PUMP A MINIMUM OF 30 MINUTES FOR AIR AND MOISTURE REMOVAL. WATCH COMPOUND GAUGE TO SEE THAT SYSTEM PUMPS DOWN INTO A VACUUM. SYSTEM WILL REACH 28- 29 1/2 INCHES HG VACUUM IN A MAXIMUM OF 5 MINUTES. IF SYSTEM DOES NOT PUMP DOWN, CHECK ALL CONNECTIONS AND LEAK TEST IF NECESSARY.
3. CLOSE GAUGE MANIFOLD HAND VALVES AND SHUTOFF PUMP.
4. CHECK ABILITY OF SYSTEM TO HOLD VACUUM. WATCH COMPOUND GAUGE TO SEE THAT GAUGE DOES NOT RISE AT A FASTER RATE THAN 1 INCH VACUUM EVERY 4 OR 5 MINUTES. IF COMPOUND GAUGE RISES AT TOO RAPID A RATE, INSTALL PARTIAL CHARGE AND LEAK TEST.

THEN DISCHARGE SYSTEM AS OUTLINED IN (DISCHARGE SYSTEMS).

LEAK TESTS

TESTING THE REFRIGERANT SYSTEM FOR LEAKS IS ONE OF THE MOST IMPORTANT PHASES OF TROUBLESHOOTING. ONE OR MORE OF THE METHODS OUTLINED WILL PROVE USEFUL IN DETECTING LEAKS OR CHECKING OR CHECKING CONNECTIONS IF SERVICE WORK IS PERFORMED. BEFORE BEGINNING ANY LEAK TEST, ATTACH A MANIFOLD GAUGE SET AND NOTE PRESSURE. IF LITTLE OR NO PRESSURE IS INDICATED, A PARTIAL CHARGE MUST BE INSTALLED. CHECK ALL CONNECTIONS, COMPRESSOR HEAD GASKET, OIL FILTER PLUG AND COMPRESSOR SHAFT SEAL FOR LEAKS. R-134A SYSTEM AN ELECTRONIC TYPE LEAK DETECTOR IS RECOMMENDED.

ELECTRONIC LEAK DETECTORS

THERE ARE A NUMBER OF ELECTRONIC LEAK DETECTORS AVAILABLE TO PERFORM LEAK TESTS.

1. MOVE THE DETECTOR PROBE ONE INCH PER SECOND IN AREAS OF SUSPECTED LEAKS.
2. POSITION THE PROBE BELOW THE TEST POINT. AS REFRIGERANT GAS IS HEAVIER THAN AIR.
3. BE SURE TO CHECK SERVICE ACCESS GAUGE PORT VALVE FITTINGS, PARTICULARLY WHEN VALVE CAPS ARE MISSING, AS DIRT ACCUMULATIONS CAN DESTROY THE SEALING AREA OF VALVE CORE WHEN MANIFOLD GAUGE SET IS ATTACHED. REPLACE MISSING VALVE CAPS AFTER CLEANING VALVE CORE AREA. VALVE CAPS SHOULD ONLY BE FINGER TIGHTENED. USING PLIERS TO TIGHTEN VALVE CAPS MAY DISTORT SEALING SURFACE OF VALVE.
4. CHECK FOR LEAKS IN MANIFOLD GAUGE SET AND HOSES, AS WELL AS THE REST OF THE SYSTEM.

FLAME-TYPE (HALIDE) LEAK DETECTORS

WHEN USING FLAME-TYPE DETECTORS, AVOID INHALING FUMES PRODUCED BY BURNING REFRIGERANT. DO NOT USE THIS TYPE DETECTOR WHERE CONCENTRATIONS OF COMBUSTIBLE OR EXPLOSIVE GASES, DUSTS OR VAPORS MAY EXIST.

1. ADJUST DETECTOR FLAME AS LOW AS POSSIBLE TO OBTAIN MAXIMUM SENSITIVITY. BE SURE COPPER ELEMENT IS CHERRY RED AND NOT BURNED AWAY. THE FLAME WILL BE ALMOST COLORLESS.
2. SLOWLY MOVE DETECTOR ALONG AREAS OF SUSPECTED LEAKS. A SLIGHT LEAK WILL CAUSE THE FLAME TO CHANGE TO A BRIGHT YELLOW- GREEN COLOR. A SIGNIFICANT LEAK WILL BE INDICATED BY A BRILLIANT BLUE FLAME. POSITION DETECTOR UNDER AREAS BEING TESTED AS REFRIGERANT GAS IS HEAVIER THAN AIR. THE PRESENCE OF DUST IN THE PICKUP TUBE MAY CAUSE A CHANGE IN THE COLOR OF THE FLAME. IF NOT RECOGNIZED, A FALSE DIAGNOSIS COULD BE MADE. STORE LEAK DETECTOR IN A CLEAN PLACE AND ENSURE HOSE IS FREE OF DUST BEFORE LEAK TESTING.
3. CHECK FOR LEAKS IN THE MANIFOLD GAUGE SET AND HOSES, AS WELL AS THE REST OF THE SYSTEM.
4. USE A SMALL FAN TO VENTILATE AREAS WHERE LEAK DETECTOR INDICATES REFRIGERANT CONSTANTLY. THESE AREAS ARE CONTAMINATED WITH REFRIGERANT AND MUST BE VENTILATED BEFORE LEAK CAN BE PINPOINTED.

USING CHARGING STATION

A VACUUM PUMP IS BUILT INTO THE CHARGING STATION AND IS CONSTRUCTED TO WITHSTAND REPEATED AND PROLONGED USE WITHOUT DAMAGE. COMPLETE MOISTURE REMOVAL FROM THE SYSTEM IS POSSIBLE ONLY WITH A VACUUM PUMP CONSTRUCTED FOR THE PURPOSE.

THE SYSTEM MUST BE COMPLETELY DISCHARGED BEFORE IT CAN BE EVACUATED. DAMAGE TO THE VACUUM PUMP MAY RESULT IF PRESSUREIZED REFRIGERANT IS ALLOWED TO ENTER.

1. CONNECT HOSE TO VACUUM PUMP. IF SYSTEM WAS DISCHARGED THROUGH CHARGING STATION.
2. OPEN LOW SIDE GAUGE HAND VALVE OF CHARGING STATION.
3. CONNECT STATION INTO 110 VOLT POWER.
4. TURN VACUUM PUMP ON ACCORDING TO INSTRUCTIONS FOR SPECIFIC STATION BEING USED.
5. EVACUATE SYSTEM WITH THE VACUUM PUMP UNTIL THE LOW PRESSURE GAUGE READS AT LEAST 28 INCHES OF VACUUM.
CONTINUE EVACUATING SYSTEM FOR AN ADDITIONAL 15 MINUTES FOR ROUTINE SYSTEM SERVICING OR 20 TO 30 MINUTES, IF ANY PARTS HAVE BEEN REPLACED.
6. CLOSE LOW SIDE GAUGE HAND VALVE, THEN TURN VACUUM PUMP OFF.
7. CHECK ABILITY OF SYSTEM TO HOLD VACUUM. WATCH LOW SIDE GAUGE TO SEE THAT GAUGE DOES NOT RISE AT A FASTER RATE THAN 1 INCH OF VACUUM EVERY 4 TO 5 MINUTES. IF LOW SIDE GAUGE RISES AT TOO RAPID A RATE, INSTALL PARTIAL CHARGE AND LEAK T.E.T. THEN EVACUATE SYSTEM AGAIN.
8. IF SYSTEM HOLDS VACUUM, CHARGE SYSTEM WITH REFRIGERANT.

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USING CHARGING STATION (J-23500-01)

1. AFTER DISCHARGING AND EVACUATING SYSTEM, CLOSE LOW PRESSURE VALVE ON CHARGING STATION.
FULLY OPEN LEFTHAND REFRIGERANT CONTROL VALVE AT BASE OF CYLINDER AND HIGH PRESSURE VALVE ON CHARGING STATION AND ALLOW REQUIRED CHARGE OF REFRIGERANT TO ENTER HIGH SIDE OF SYSTEM. WHEN FULL CHARGE HAS ENTERED SYSTEM., CLOSE REFRIGERANT CONTROL VALVE AND HIGH PRESSURE VALVE ON CHARGING STATION. (DO NOT PERMIT LEVEL OF LIQUID TO DROP BELOW ZERO MARK ON CYLINDER SIGHT GLASS.)
2. AFTER CHARGING IS COMPLETED, CLOSE MANIFOLD GAUGES AND CHECK HIGH AND LOW PRESSURES AND SYSTEM OPERATION. (READ GAUGES WITH HIGH AND LOW PRESSURE VALVES CLOSED ON CHARGING STATION.)
THE LOW PRESSURE GAUGE CAN BE DAMAGED IF BOTH HIGH AND LOW PRESSURE VALVES ARE OPENED.
3. CLOSE ALL VALVES ON CHARGING STATION AND CLOSE REFRIGERANT DRUM VALVE WHEN ALL OPERATIONS ARE FINISHED.
4. AFTER COMPLETING OPERATIONAL CHECK, BACK-SEAT SUCTION AND DISCHARGE SERVICE VALVES TO THEIR NORMAL OPERATING POSITION BY TURNING THEM FULLY COUNTER-CLOCKWISE.
5. DISCONNECT HIGH AND LOW PRESSURE CHARGING HOSES FROM COMPRESSOR.
6. OPEN VALVE ON TOP OF CYLINDER TO REMOVE REMAINING REFRIGERANT AS CHARGING CYLINDER IS NOT DESIGNED TO STORE REFRIGERANT.
7. REPLACE QUICK SEAL CAPS ON COMPRESSOR SERVICE VALVES.

CHARGING OF SYSTEM

DISPOSABLE CAN METHOD

1. CONNECT A SUITABLE REFRIGERANT DISPENSING VALVE TO REFRIGERANT CAN, THEN CONNECT MANIFOLD GAUGE SET TO SYSTEM.
2. CONNECT CENTER LINE OF GAUGE SET TO FITTING ON CONTAINER VALVE.
3. PURGE AIR FROM CENTER LINE BY LOOSENING CONNECTION AT CENTER FITTING ON GAUGE SET, THEN SLIGHTLY OPENING VALVE AT CONTAINER FOR A SECOND OR TWO. RETIGHTEN CONNECTION AT GAUGE AND CLOSE VALVE ON CONTAINER.
4. OPEN MANIFOLD GAUGE SET LOW SIDE VALVE AND ALLOW REFRIGERANT TO ENTER SYSTEM. THE REFRIGERANT CAN MUST BE KEPT UPRIGHT IF VEHICLE LOW PRESSURE SERVICE GAUGE PORT IS NOT ON SUCTION ACCUMULATOR-DRIER, OR SUCTION ACCUMULATOR FITTING.
5. WHEN CAN IS EMPTY, CLOSE VALVE AND REMOVE CAN. CONNECT NEW CAN, OPEN VALVE AND CONTINUE CHARGING UNTIL CORRECT WEIGHT OF REFRIGERANT HAS ENTERED SYSTEM.
6. IF SYSTEM STOPS DRAWING REFRIGERANT IN BEFORE SYSTEM IS COMPLETELY CHARGED, START ENGINE, TURN A/C ON AND OPERATE BLOWER AT HIGH SPEED UNTIL REMAINING REFRIGERANT IS DRAWN INTO SYSTEM.
7. WHEN CHARGING IS COMPLETE, CLOSE VALVE AT CONTAINER AND RUN ENGINE FOR APPROXIMATELY 30 SECONDS TO CLEAR LINES AND GAUGES. THEN CLOSE LOW SIDE VALVE ON GAUGE SET AND DISCONNECT REFRIGERANT CAN FROM CENTER HOSE.

GENFCOR
LA 11/95

SYSTEM CHECK

WHILE A DETAILED DIAGNOSTIC PROCEDURE FOR ALL AIR CONDITIONING SYSTEMS WOULD BE IMPRACTICAL DUE TO THE MANY VARIATIONS IN CONSTRUCTION AND OPERATION, THERE ARE THREE FUNDAMENTAL COMPONENTS OF A TOTAL DIAGNOSIS:

1. REFRIGERANT SYSTEMS MUST HAVE AN ADEQUATE, BUT NOT EXCESSIVE CHARGE.
2. DETERMINATION MUST BE MADE WHETHER THE REFRIGERANT SYSTEM IS GOVERNED BY A CYCLING CLUTCH COMPRESSOR OR BY VALVES WHICH CONTROL EVAPORATOR PRESSURE.
3. THE AIR DISTRIBUTION SYSTEM (BLOWER MOTOR, SWITCHES, VACUUM LINES AND AIR DUCTS) MUST BE OPERATIONAL BEFORE CHECKING THE REFRIGERANT SYSTEM.
CHECK THE BLOWER. IF INOPERATIVE, EXAMINE SWITCHES, FUSES, CONNECTIONS, WIRING AND THE BLOWER MOTOR. IF BLOWER IS OPERATING BUT THE AIR OUTPUT IS LOW, CHECK FOR LOOSE WIRE CONNECTIONS OR SHORTS, UNDERCHARGED BATTERY, DIRTY OR LOOSE SWITCH CONTACTS, OR A FAULTY BLOWER MOTOR.

INSPECT THE AIR DISTRIBUTION SYSTEM FOR OBSTRUCTIONS AND ENSURE PROPER DOOR OPERATION. IF THE BLOWER IS CIRCULATING THE AIR BUT THERE IS NO COOLING, CHECK THE COMPRESSOR DRIVE BELT. ENSURE IT IS NOT BROKEN OR SLIPPING. IF THE PULLEY IS TURNING BUT THE COMPRESSOR SHAFT IS NOT, CHECK THE MAGNETIC CLUTCH. ON MODELS EQUIPPED WITH A CYCLING CLUTCH, THE FOLLOWING HAND CHECK METHOD WILL DETERMINE WHETHER THE PROBLEM LIES IN THE REFRIGERANT SYSTEM OR FURTHER TESTING OF THE DISTRIBUTION SYSTEM IS REQUIRED.

1. WITH ENGINE WARMED UP AND AT FAST IDLE, SET THERMOSTAT TO COOL AND BLOWER ON HIGH.
2. PLACE ONE HAND ON THE EVAPORATOR INLET PIPE AND THE OTHER ON THE ACCUMULATOR SURFACE WITH THE COMPRESSOR ENGAGED.
3. IF BOTH SURFACES ARE THE SAME TEMPERATURE AND COLDER THAN AMBIENT TEMPERATURE, REFRIGERANT SYSTEM IS NORMAL.
4. IF THE INLET PIPE IS COOLER THAN THE ACCUMULATOR SURFACE, REFRIGERANT SYSTEM IS LOW ON FREON.
ADD 14 OUNCES (ONE CAN) OF ADDITIONAL REFRIGERANT.
CHARGE. ADD SMALL AMOUNTS OF REFRIGERANT UNTIL BOTH FEEL THE SAME TEMPERATURE. THEN
5. IF INLET PIPE IS FROSTED OVER AND ACCUMULATOR SURFACE IS WARMER, PROCEED AS IN STEP 4.
THE INDIVIDUAL COMPONENTS OF THE REFRIGERANT SYSTEM WILL OFTEN GIVE CLEAR SIGNS OF THEIR MALFUNCTIONING. USE THE FOLLOWING GENERAL DESCRIPTIONS TO PINPOINT FAULTY COMPONENTS.

SEE SHEET ON PINPOINTING FAULTY COMPONENTS.

PINPOINTING FAULTY COMPONENTS

COMPRESSOR

A FAULTY COMPRESSOR WILL DISPLAY ONE OR MORE OF THE FOLLOWING SYMPTOMS: NOISE, SEIZURE, LEAKAGE OR LOW INLET AND DISCHARGE PRESSURE. A STEADY, RESONANT NOISE FROM THE COMPRESSOR IS NOT NECESSARILY AN INDICATION OF A PROBLEM, BUT IRREGULAR METALLIC RATTILING MAY INDICATE BROKEN PARTS AND SHOULD BE INVESTIGATED. A THUMPING NOISE FROM THE COMPRESSOR AND A COOL SWEATING SUCTION LINE INTO IT MAY INDICATE AN OVERCHARGED SYSTEM. CHECK SEIZURE BY DISENGAGING THE MAGNETIC CLUTCH AND ROTATING THE DRIVEN PLATE. IF THE COMPRESSOR IS SEIZED, THE DRIVEN PLATE WILL NOT ROTATE. FALSE COMPRESSOR SEIZURE MAY OCCUR AFTER AN EXTENDED PERIOD OF DISUSE OR STORAGE. LUBRICATING OIL DRAINS AWAY FROM THE POLISHED SURFACES OF BALL SEATS AND AXIAL PLATE AND THE COMPRESSOR APPEARS TO BE SEIZED. USE A CLUTCH HUB HOLDING TOOL TO TURN THE COMPRESSOR IN THE OPPOSITE DIRECTION OF ROTATION AT LEAST THREE REVOLUTIONS. CHECK FOR FALSE COMPRESSOR SEIZURE IF COMPRESSOR HAS NOT BEEN USED IN A MONTH OR LONGER. IF COMPRESSOR IS NOT SEIZED BUT WILL NOT ROTATE, CHECK FOR CURRENT AT MAGNETIC COIL. LOW DISCHARGE PRESSURE MAY BE CAUSED BY FAULTY SEALS WITHIN THE COMPRESSOR, A RESTRICTION IN THE COMPRESSOR OR ELSEWHERE, OR BY A LOW REFRIGERANT CHARGE. THE COMPRESSOR MUST HAVE THE CORRECT AMOUNT OF THE PROPER VISCOSITY OIL. EXCESS OIL WILL RESTRICT REFRIGERANT CIRCULATION AND REDUCE COMPRESSOR OUTLET PRESSURE.

CONDENSER

THE CONDENSER MAY MALFUNCTION EITHER DUE TO LEAKAGE OR RESTRICTION. IF RESTRICTED, COMPRESSOR DISCHARGE PRESSURE WILL BE EXCESSIVE. ICY OR FROSTY SPOTS ON THE CONDENSER WILL INDICATE A PARTIAL RESTRICTION WITHIN THE CONDENSER AND RESULT IN HIGH DISCHARGE PRESSURES.

EVAPORATOR

A FAULTY EVAPORATOR WILL PROVIDE INSUFFICIENT COOLING TO THE VEHICLE. THE CORE MAY BE RESTRICTED WITH DIRT, THE CASE MAY BE CRACKED, OR A SEAL MAY BE LEAKING SUFFICIENTLY TO PREVENT COOLING. IF EVAPORATOR RESTRICTION IS DUE TO ICING, THE EXPANSION VALVE, CAPILLARY TUBE OR SUCTION THROTTILING VALVE, IF EQUIPPED, MAY BE AT FAULT AND SHOULD BE INVESTIGATED.

SINCE THERE IS A CONSTANT CONDENSATION OF ATMOSPHERIC MOISTURE ON THE OUTSIDE OF THE EVAPORATOR COILS, ENSURE THAT THE DRAINING SYSTEM IS UNOBSTRUCTED AND CLEAN.

NOTE: ALL AMBULANCES HAVE AN AUXILIARY EVAPORATOR IN THE REAR.

PINPOINTING FAULTY COMPONENTS

RECEIVER-DRYER

A RESTRICTION INSIDE THE RECEIVER-DEHYDRATOR WILL RESULT IN HIGH HEAD PRESSURES IF THE RESTRICTION IS ON THE INLET SIDE OF THE UNIT. A RESTRICTION AT THE OUTLET SIDE WILL CAUSE LOW HEAD PRESSURES AND LITTLE OR NO COOLING. AN EXCEEDINGLY COLD RECEIVER-DEHYDRATOR MAY BE RESTRICTED.

IF THE SYSTEM HAS BEEN IN SERVICE FOR A CONSIDERABLE AMOUNT OF TIME, THE DESICANT ELEMENT, MAY HAVE LOST IT'S MOISTURE ABSORBING ABILITY. THIS CONDITION IS INDICATED BY THE CONSTANT PRESENCE OF SMALL BUBBLES IN THE SIGHT GLASS IF EQUIPPED AND A WIDE DIFFERENCE IN TEMPERATURE BETWEEN THE INLET AND OUTLET RECEIVER-DEHYDRATOR LINES.

THERMOSTATIC EXPANSION VALVE

FAULTY EXPANSION VALVES WILL BE INDICATED BY LOW SUCTION AND DISCHARGE PRESSURES ON THE MANIFOLD GAUGE SET. IN MOST CASES THE POWER ELEMENT FAILS AND THE VALVE CLOSES. OCASSIONALLY THE INLET SCREEN BECOMES CLOGGED WITH CONTAMINATION OR DESICANT BEADS LOOSE IN THE SYSTEM.

REFRIGERANT LINE RESTRICTIONS

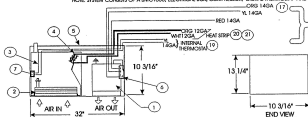
1. A RESTRICTED SUCTION LINE IS INDICATED BY LOW SUCTION PRESSURE AT THE COMPRESSOR, LOW DISCHARGE PRESSURE AND LITTLE OR NO COOLING.
2. A RESTRICTED DISCHARGE LINE WILL USUALLY CAUSE THE PRESSURE RELIEF VALVE TO OPEN.
3. A RESTRICTED LIQUID LINE WILL CAUSE LOW SUCTION AND DISCHARGE PRESSURES AND LITTLE OR NO COOLING.

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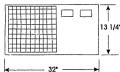
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MH135A-SATX110-12

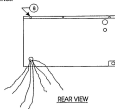
NOTE: SYSTEM CONSISTS OF A BMC1006, ELECTRICAL BOX, COMPRESSOR, DIGITAL THERMOSTAT AND GAS EVAPORATOR LINE.



IMPORTANT: MAKE SURE THAT ENGINE HEATER IS NOT A PART OF SHORE LINE THAT RUNS 110V. FAILURE TO COMPLY WILL CAUSE THE SYSTEM TO EXCEED AMPERAGE RATINGS.



FRONT VIEW



REAR VIEW

NOTE: THE ENTIRE INSIDE OF THE SHEET METAL PARTS SHALL BE COVERED WITH INSULATION

INTERNAL HOSE

FITTING	HOSE	FITTING
381321	#6 18" LONG	BL1721
381323	#10 18" LONG	BL1723

SHIP LOOSE FITTINGS

FITTING	USED ON	QTY
381321	FOR #6 HOSE	2
BL1011-1	FOR #6 HOSE	1
BL1302	FOR #6 HOSE	1
BL1322	FOR #6 HOSE	1
BL1323	FOR #10 HOSE	2
BL1013-1	FOR #10 HOSE	1

PARTS LIST

ITEM	DESCRIPTION	QTY
1	BH1400A 12V BLOWER MOTOR	1
2	HQ1311 R22 CORE	1
3	DRAIN PAN	1
4	HEAT STRP 120V 1.25 KW 9.5 AMP	1
5	CHANGES	1
6	M 916 RESISTOR	1
7	R1061-30 THERMO (INTERNAL)	1
8	3/8 CHASSIS SCREWS TORQ715WZ	28
9	11-2177 GROMMET	1
10	1106P RESISTOR CLIP	1
11	42201 COOK DAPE 1FT	1
12	1-27518WZ SCREWS FOR CORE	4
13	040444.01 R22 EXPANSION VALVE	1
14	TF6-444 DIGITAL THERMOSTAT	1
15	C151A025 COMPRESSOR	1
16	ELECTRICAL WIRING BOX	1
17	WIRE ORANGE 14GA	6 FT
18	WIRE BLACK 14GA	6 FT
19	WIRE YELLOW 14GA	8 FT
20	WIRE WHITE 12GA	5FT
21	WIRE ORANGE 12 GA	6 FT
22	1100-9 (10x4) 45R FACE PLATE	1
24	LEK125 INSULATION 6 SQ. FT.	1
25	FOAM INSULATION 2"X13'X11"	1
26	Compressor 061	1
27	BT7250-32L SLIDE COILN 14GA	6
28	TE55452105 18WG TERMINAL 14GA	1
29	10P6M4H2 MOUNTING SCREWS	14
30	10PHR2 KEP NUTS	14
31		
32	13-10P 18WG TERMINAL 12GA	1
33	73P250-32W SLIDE COILN 12GA	1
34		
35	WIRING LOOM 3/8 SPT	6 FT

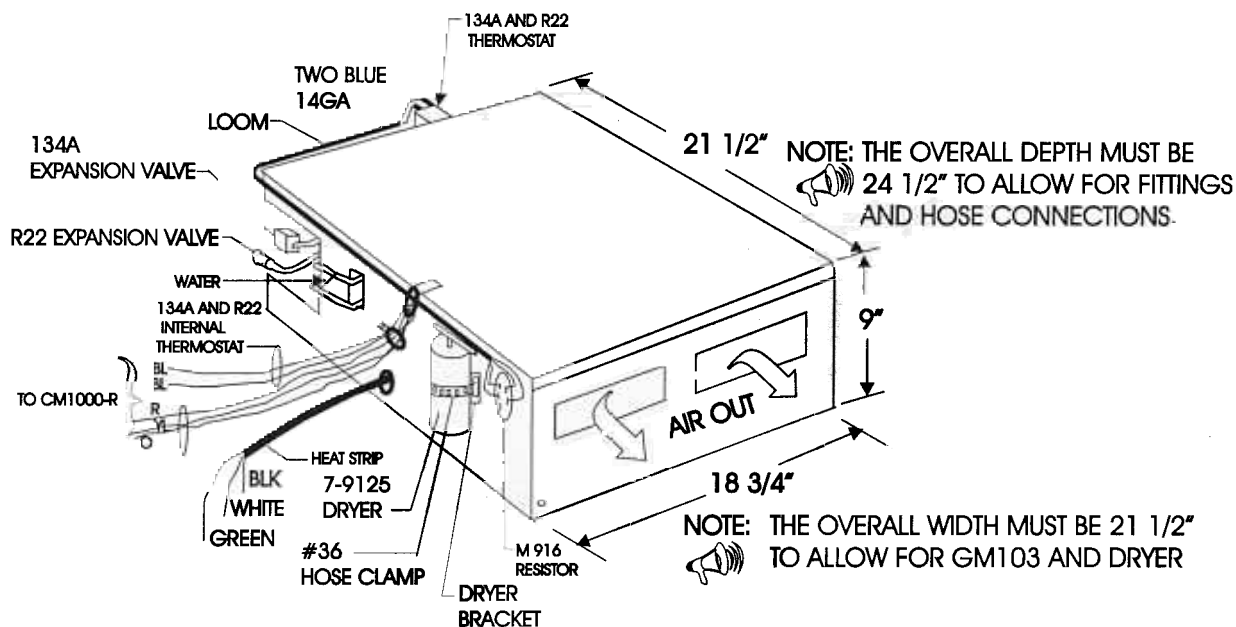
SAHA.CDR
LA 03/12/99
UPDATE:08/27/1999

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MODEL: 110-12 VOLT COMBO

2000 SERIES

STANDARD DEPTH SERIES



A/C R22 SIDE

SPECIFICATIONS

VOLT: 115 V
 PHASE: SINGLE
 HZ: 60 HZ
 LOCK ROTOR AMPS: 60
 BTU = 15000 BTU/HR
 MOTOR CURRENT = 12.0 AMPS

HEAT: HEAT STRIP: 2.69 KW, 120V @ 22 AMPS = 9180 BTU
 OR HEAT STRIP: 1.20 KW, 120V @ 10 AMPS = 4100 BTU

12 VOLT HEAT

HEAT: 36000 BTU
 BLOWER: CFM 475

12 VOLT A/C

24000 BTU/HR 2 TON EXPANSION VALVE
 OR
 30000 BTU/HR 2 1/2 TON EXPANSION VALVE



NOTE: WHEN USING THE HEAT STRIP AT 9180 BTU:

A CIRCUIT BREAKER OF 30 AMPS IS SUGGESTED TO HANDLE THE TOTAL AMPERAGE OF THE SYSTEM
 A CIRCUIT BREAKER OF 20 AMPS MAY BE USED WITH THE 1.20 KW 4100BTU



NOTE: MAKE SURE THAT ENGINE HEATER IS NOT A PART OF SHORE LINE
 THAT RUNS TO 110VOLTS.

FAILURE TO COMPLY WILL CAUSE THE SYSTEM TO EXCEED AMPERAGE RATING.

2000 COMBO SERIES.CDR
 04/12/01
 LA

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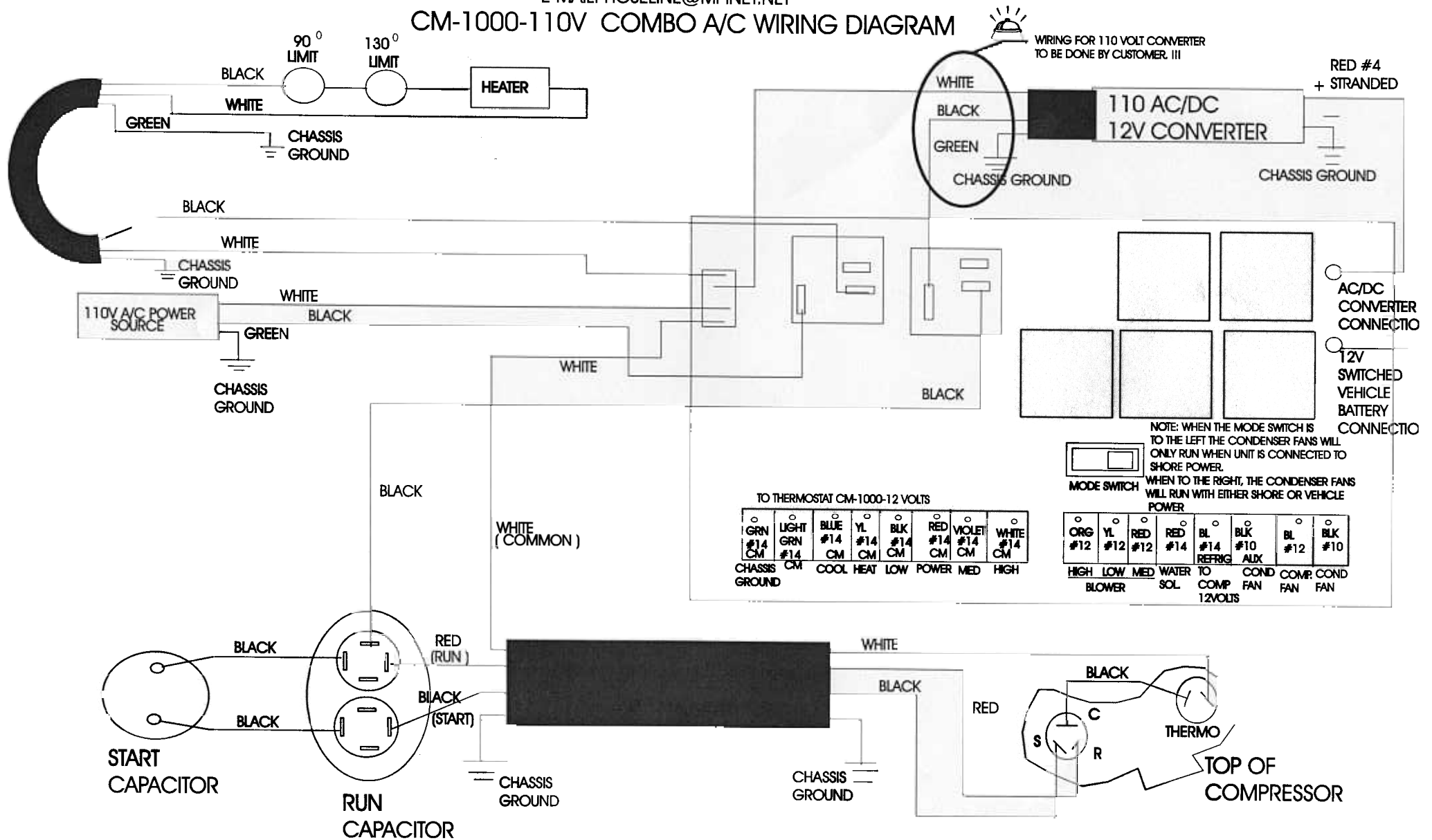
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CM-1000-110V COMBO A/C WIRING DIAGRAM

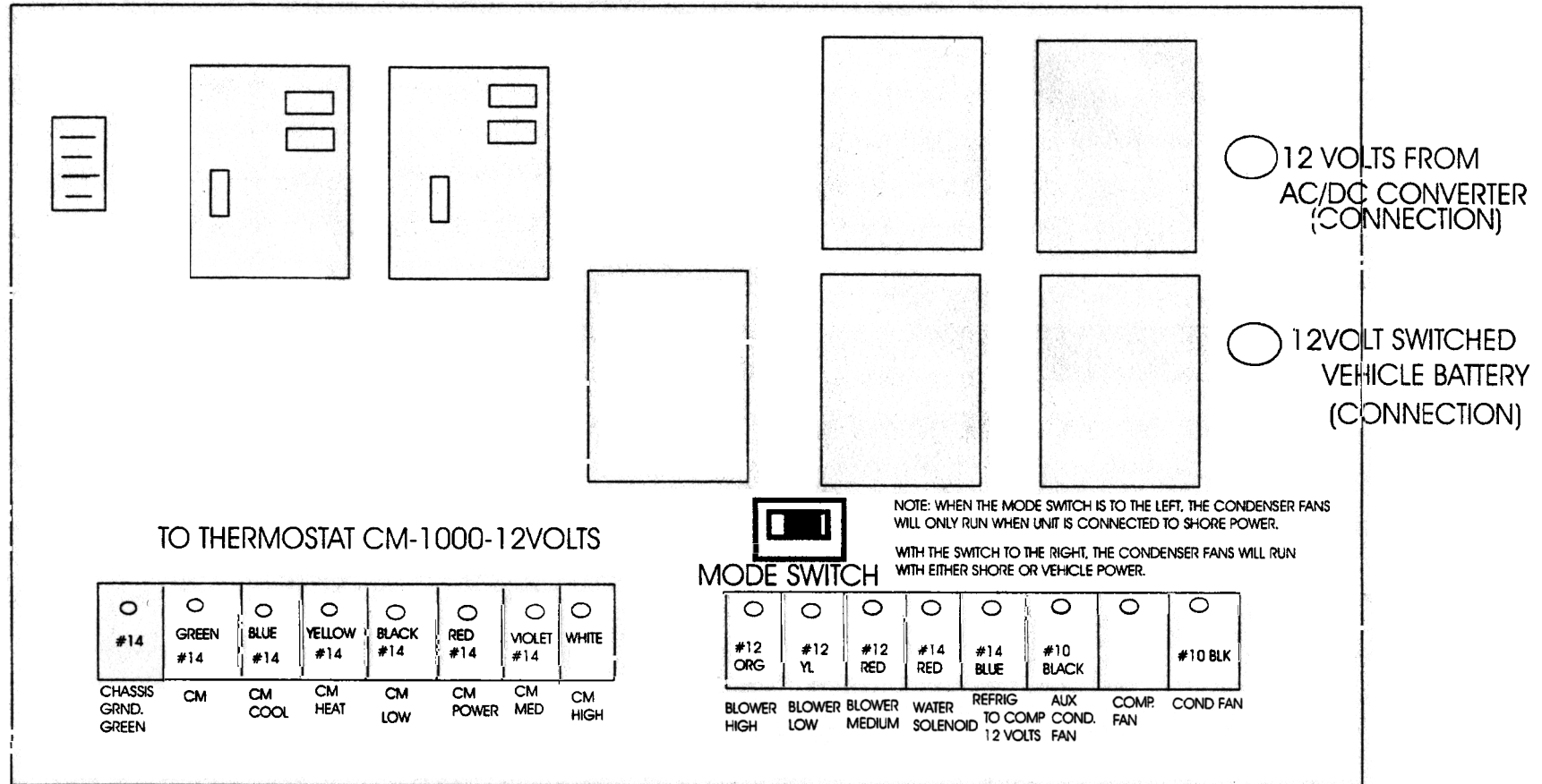


14-10-2

110ACCMCKTWR.CDR
02/28/01 LA

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CM-1000-110V COMBO BOARD CONNECTIONS

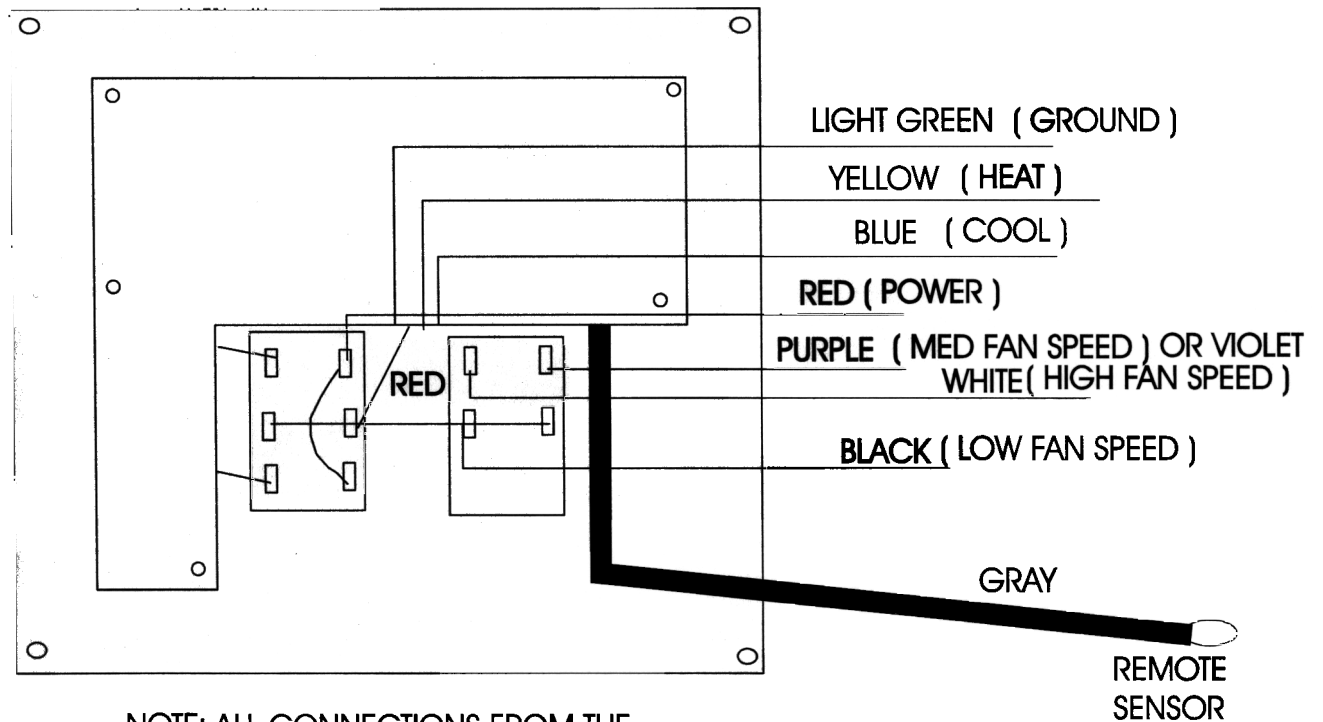


110-T2110VCKTWR.CDR
 01/24/01 LA (NEW)

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CM1000-R WIRING

REAR VIEW ON CIRCUIT BOARD SIDE



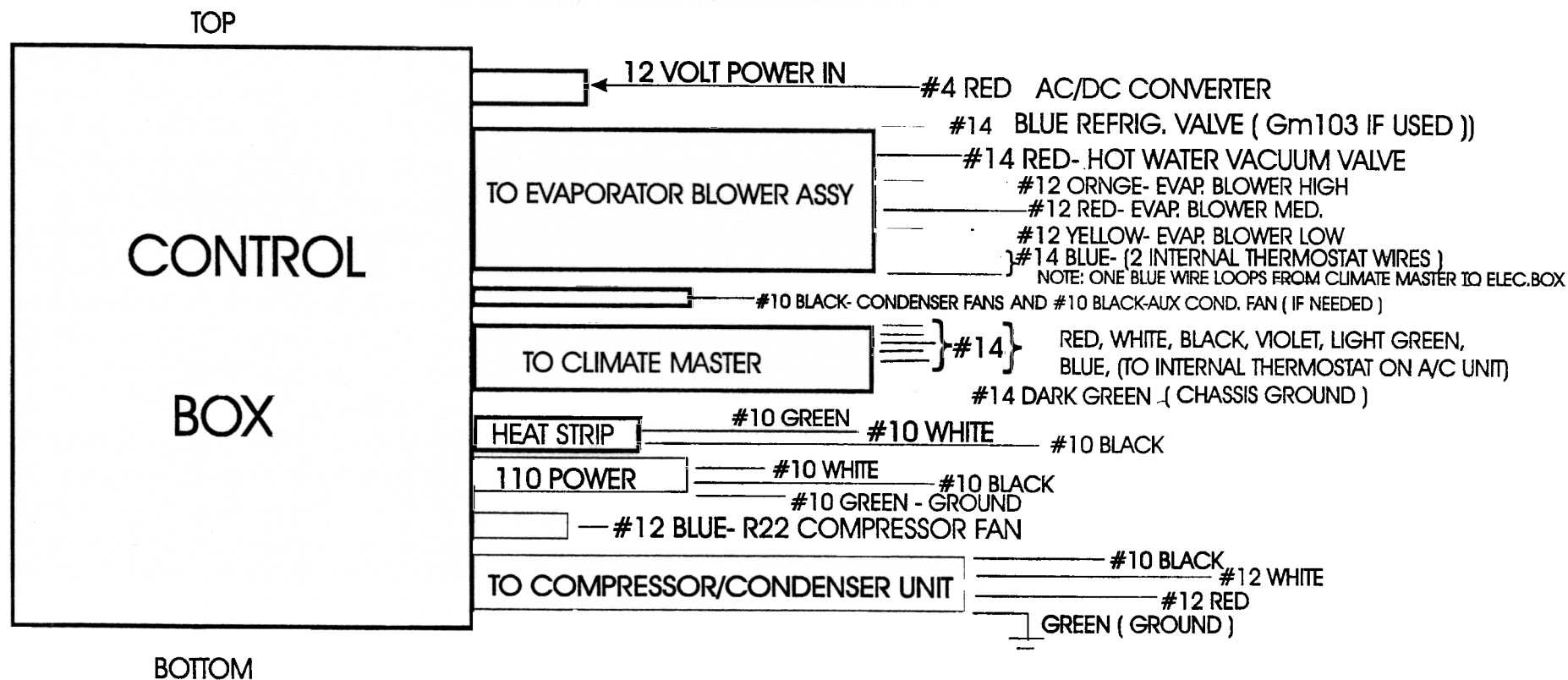
NOTE: ALL CONNECTIONS FROM THE
CM1000-R ARE MADE TO
THE CIRCUIT BOARD IN THE ELECTRIC
CONTROL BOX.

CM1000WR.CDR
02/06/01 LA

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110-12 VOLT COMBO UNITS

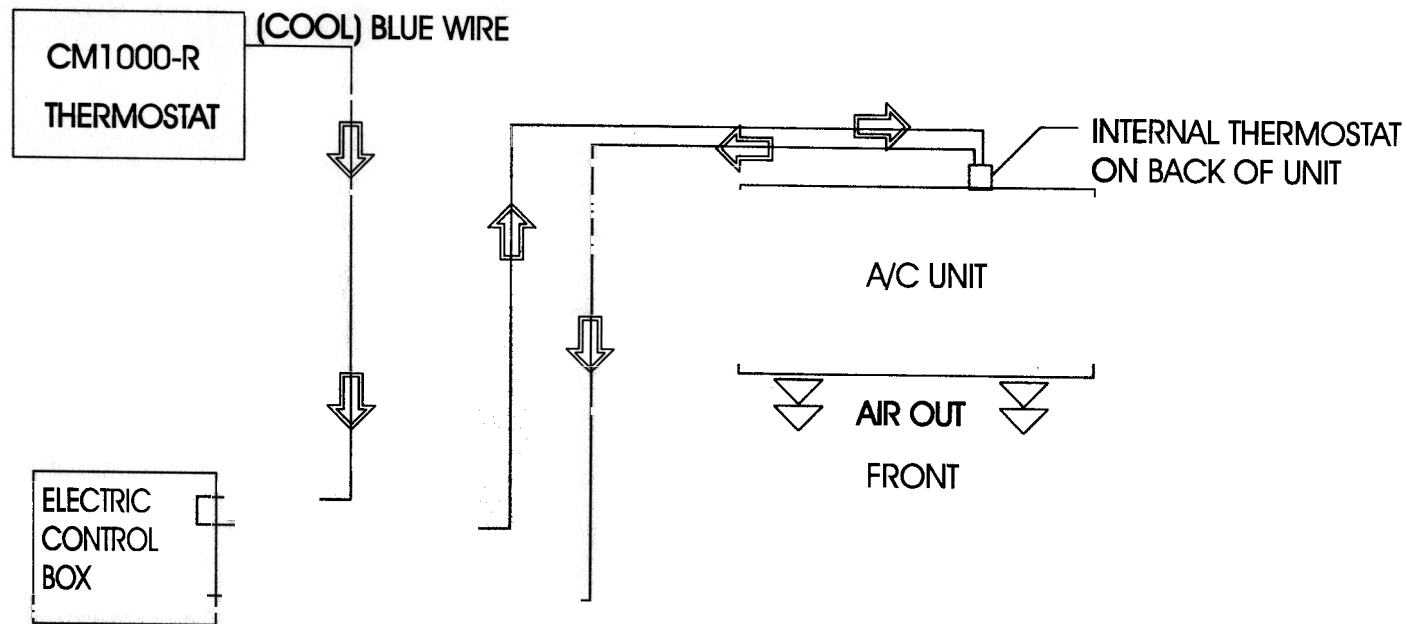
12 VOLT WIRING



12VWRCKTCOMBO.CDR
 04/04/01 LA

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CM1000-R CONNECTION TO A/C UNIT AND ELECTRIC CONTROL BOX



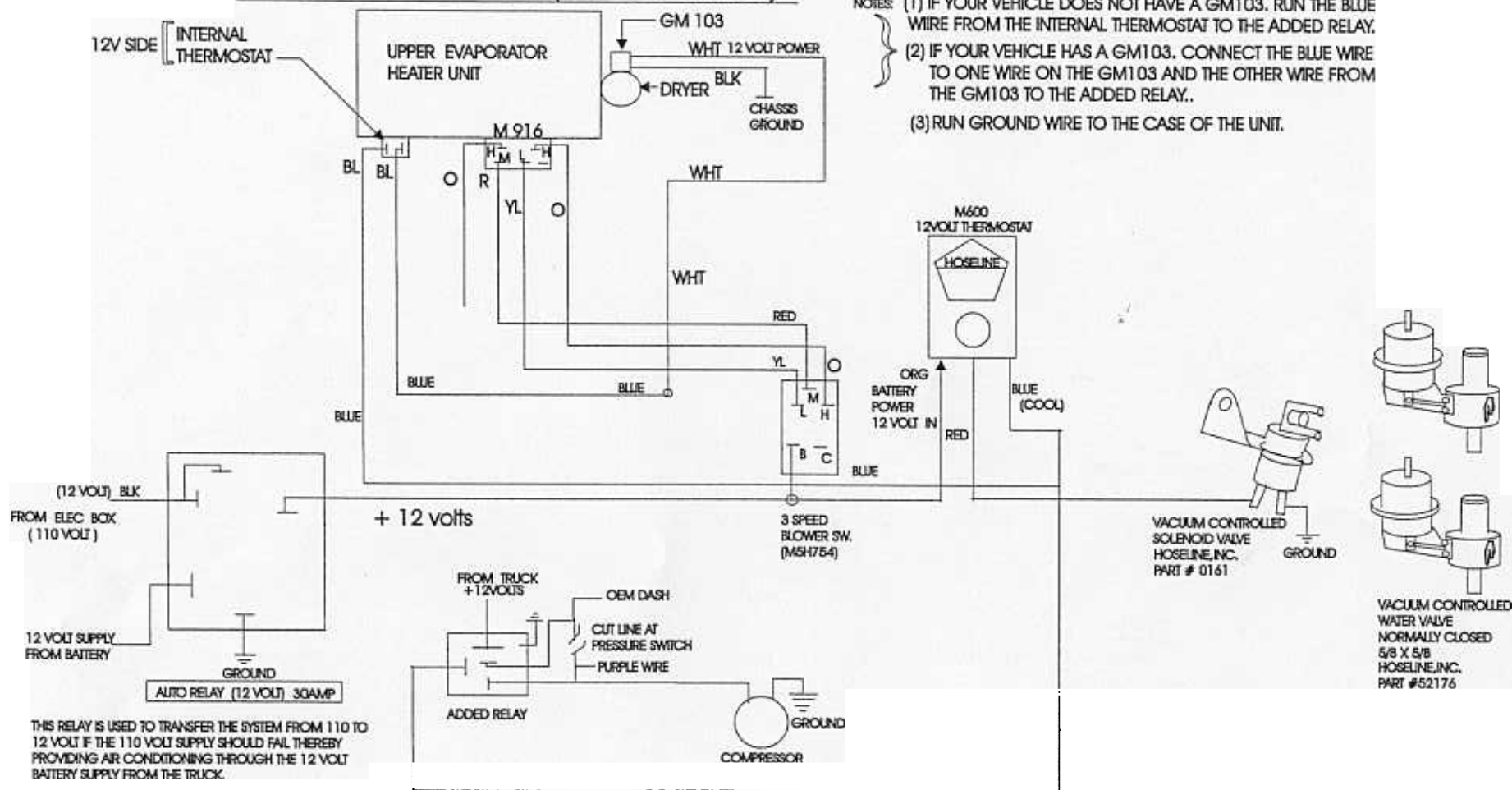
CMTOSYSTEM.CDR
04/04/01 LA

14-10-6

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110-12 VOLT COMBO UNIT (12 VOLT WIRING)

- NOTES: (1) IF YOUR VEHICLE DOES NOT HAVE A GM103. RUN THE BLUE WIRE FROM THE INTERNAL THERMOSTAT TO THE ADDED RELAY.
 (2) IF YOUR VEHICLE HAS A GM103. CONNECT THE BLUE WIRE TO ONE WIRE ON THE GM103 AND THE OTHER WIRE FROM THE GM103 TO THE ADDED RELAY..
 (3) RUN GROUND WIRE TO THE CASE OF THE UNIT.



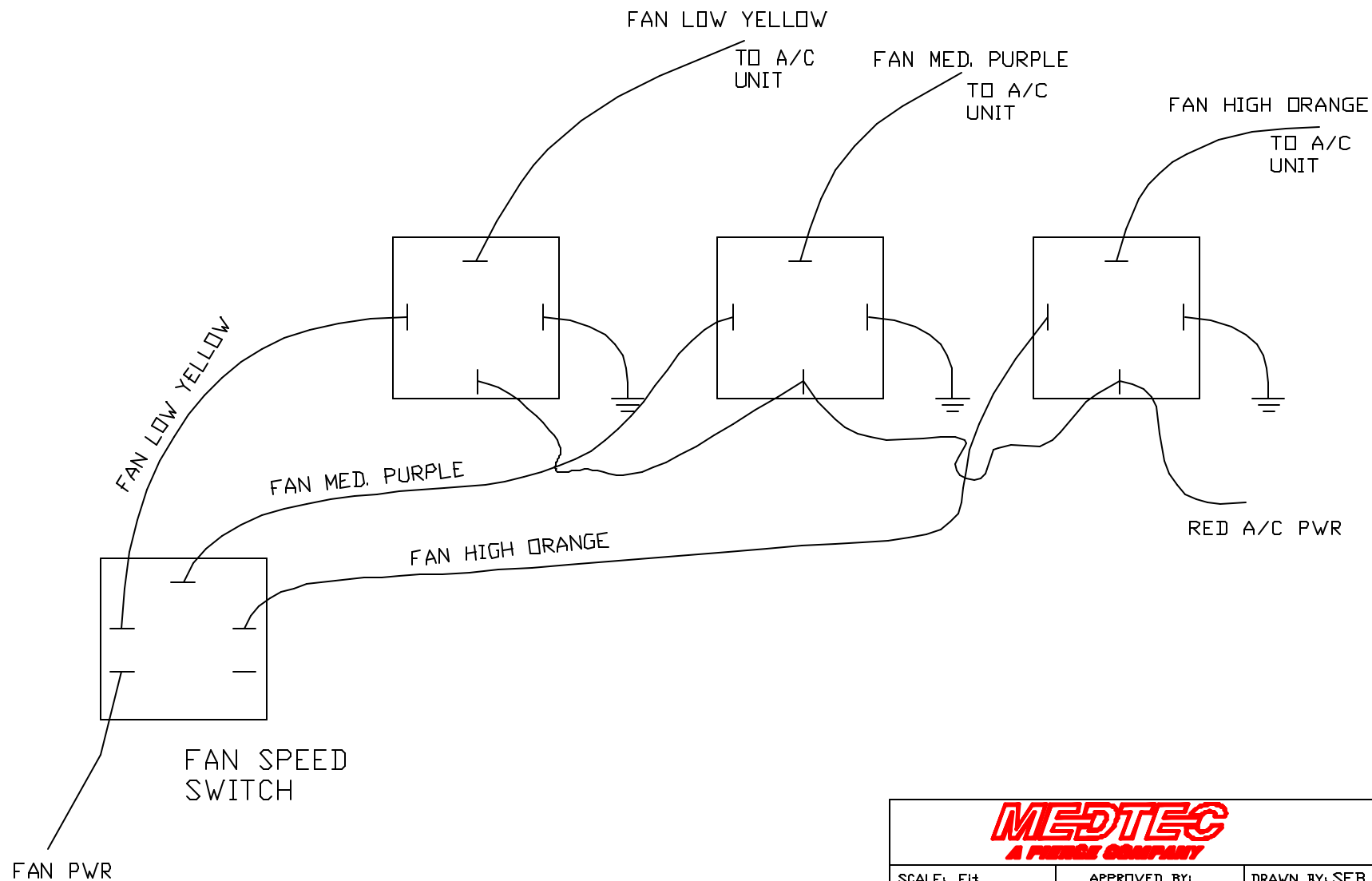
NOTE: THIS DRAWING APPLIES TO FORD, FREIGHTLINER AND INTERNATIONAL TYPE TRUCKS ONLY

UPDATE: 10/12/00 LA
 REARRANGED AUTO
 RELAY AND WIRING
 SETUP

COMBO12HR.CDR
 LA 08/07/00

14-10-7

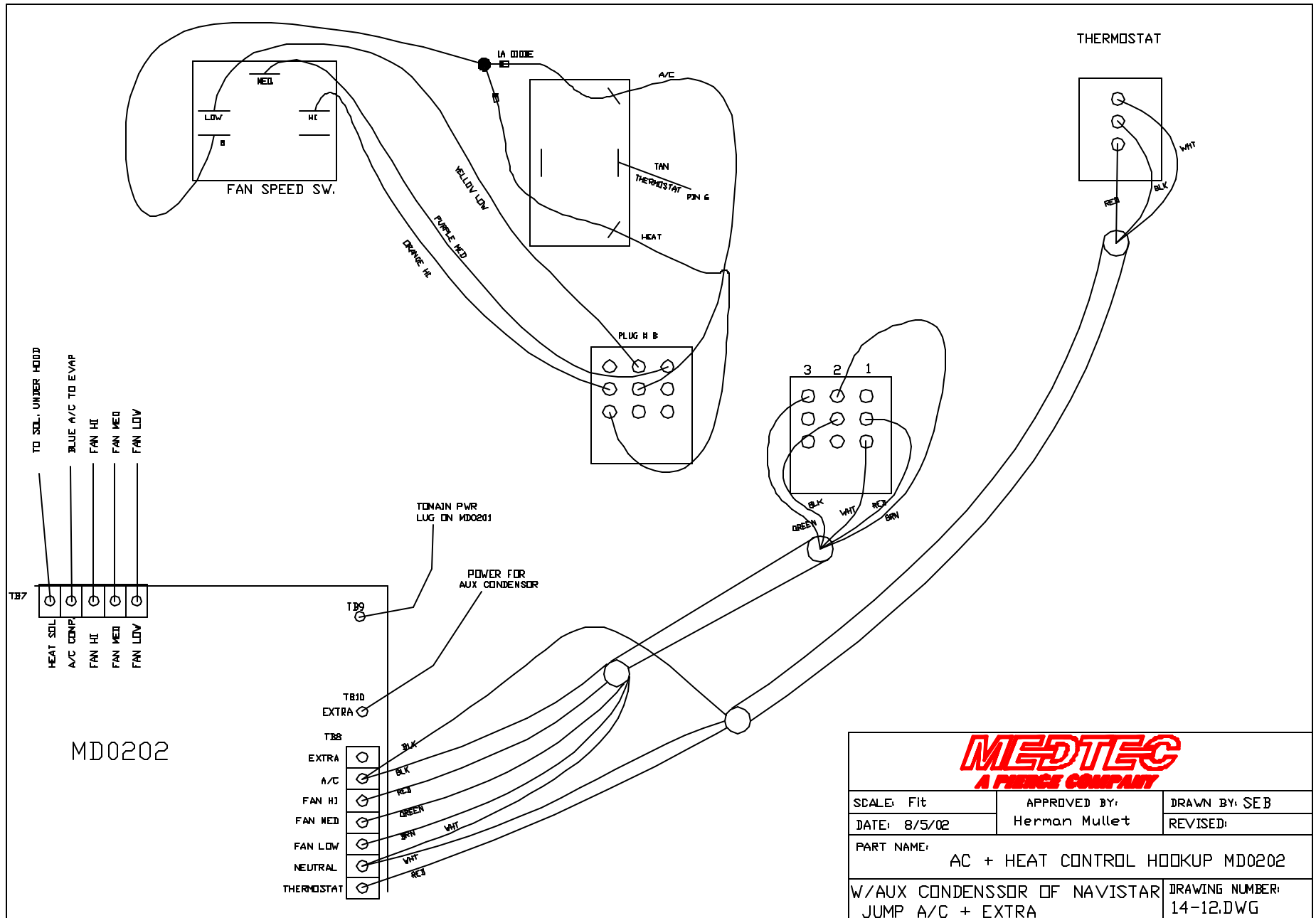
14-11



MEDTEC
A FURNESS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 3/6/02	Herman Mullet	REVISED:
PART NAME:		
PRO AIR COMBO UNIT		
	DRAWING NUMBER:	
	14.11.dwg	

14-12



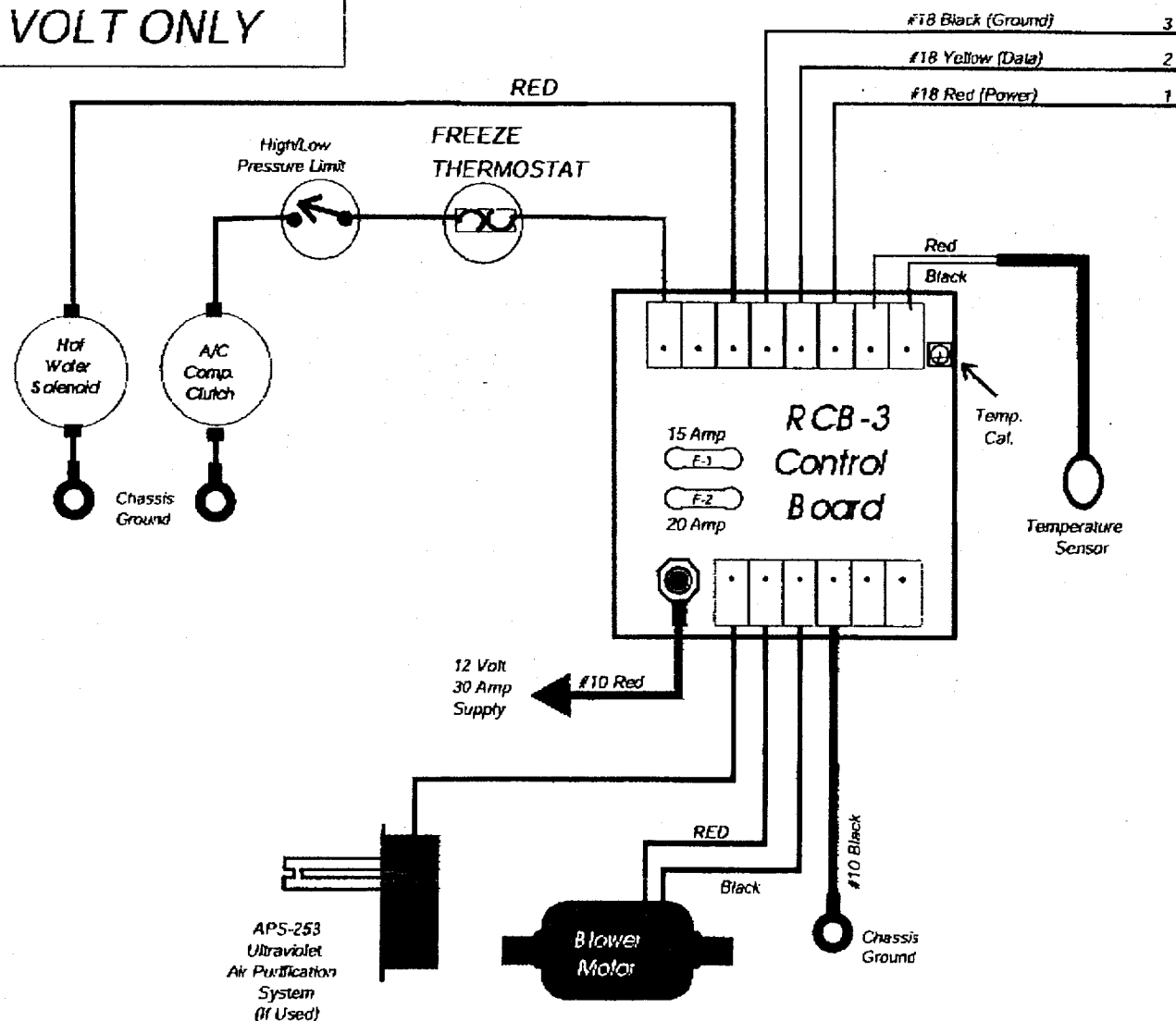
MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/5/02		REVISED:
PART NAME: AC + HEAT CONTROL HOOKUP MD0202		
W/AUX CONDENSOR OF NAVISTAR JUMP A/C + EXTRA		DRAWING NUMBER: 14-12.DWG

CM-3000 with
RCB-3 (Single Blower)
WIRING DIAGRAM

12 VOLT ONLY

HOSELINE, INC.
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CM-3000
CONTROL PANEL



Notes:

RCB-3 is for single blower systems where one blower is used for both heating and cooling.

RCB-4 is used for dual blower operation where separate blowers are used for heating and cooling.

Fuse F-1 (15 Amp) provides protection for the hot water solenoid and compressor clutch. F-1 also supplies power to the CM-3000.

Fuse F-2 (20 Amp) provides protection for the blower motors.

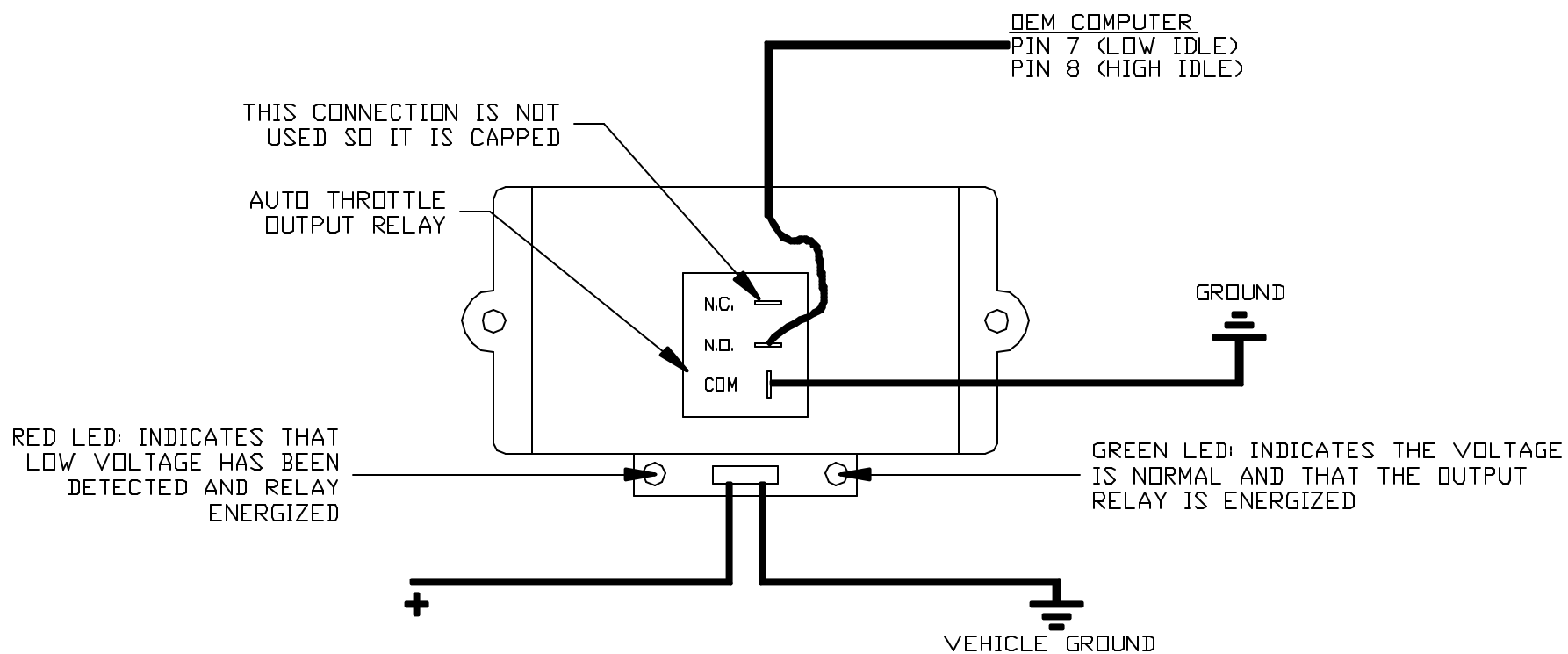


INTRODUCTION-Kussmaul 091-84 AUTO THROTTLE 1

The Model 091-84 AUTO THROTTLE 1 is a voltage sensor designed to detect when insufficient alternator output causes the battery voltage to drop. Whenever the AUTO THROTTLE 1 is activated, it closes a relay. This relay remains closed for 5 minutes or until the voltage rises above 13.4 volts. Subsequently, when the voltage drops below 12.5 volts for a period of 15 seconds, the AUTO THROTTLE 1 relay will again close. The relay closure is used by the installer to increase the engine RPM and thus the alternator's output.

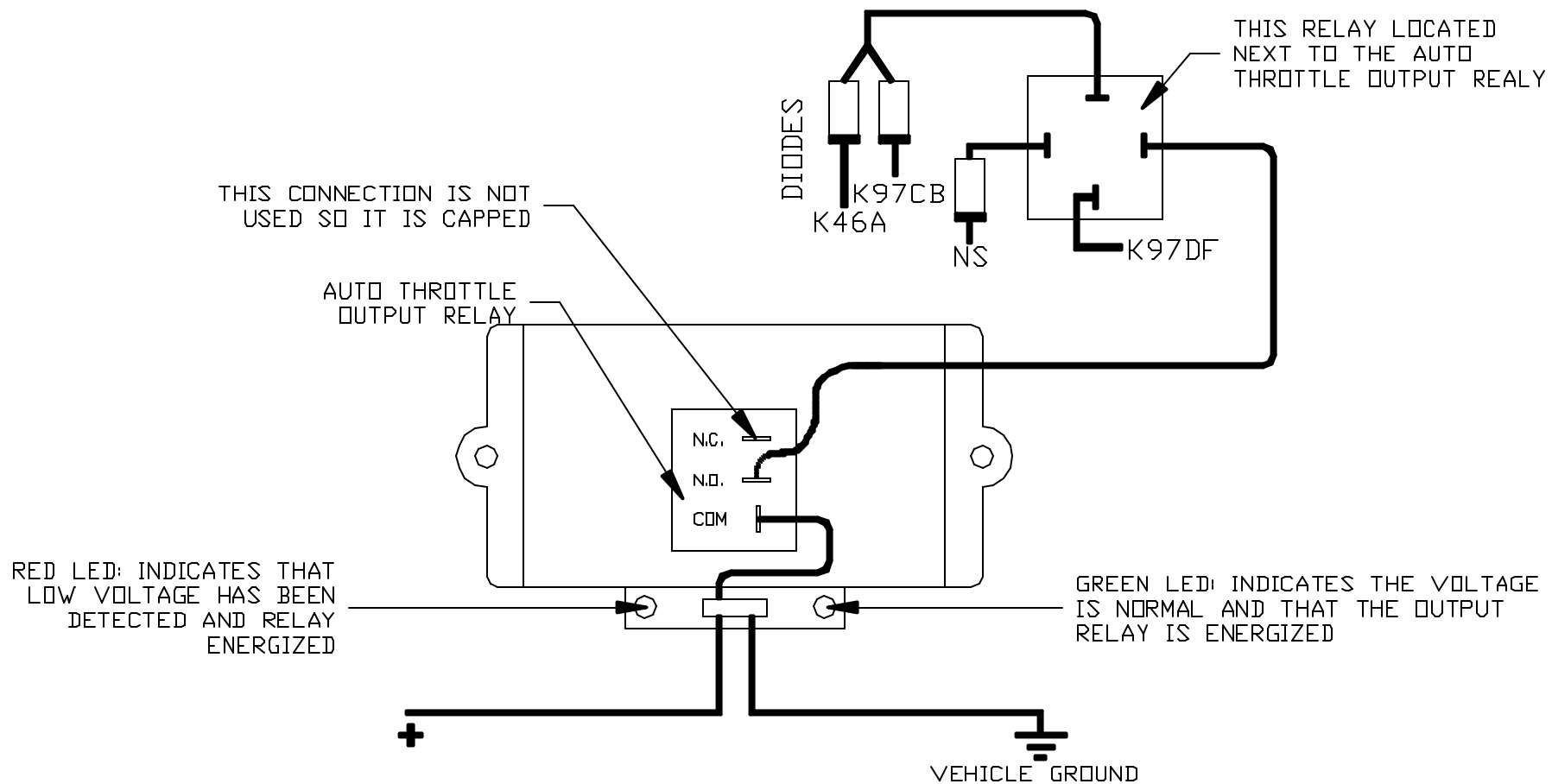
Once the AUTO THROTTLE 1 relay is operated, it will always remain closed for a period of 5 minutes or until the sensed voltage rises above 13.4 volts, whichever occurs later. Red and green indicator lights are provided to indicate the status and assist at installation. The green LED is lit whenever the AUTO THROTTLE 1 is enabled. When low voltage is detected for more than 15 seconds, the relay is energized, the red LED lights and the green LED is extinguished.

The installer is cautioned that this device contains no interlocks. Safety interlocks must be provided to assure that the AUTO THROTTLE 1 does not inadvertently advance the throttle. It is suggested that the interlock interrupt the 12 VDC. This will insure that all timing circuits in the AUTO THROTTLE 1 are reset when it is enabled.



MEDTEC
A PIERCE COMPANY

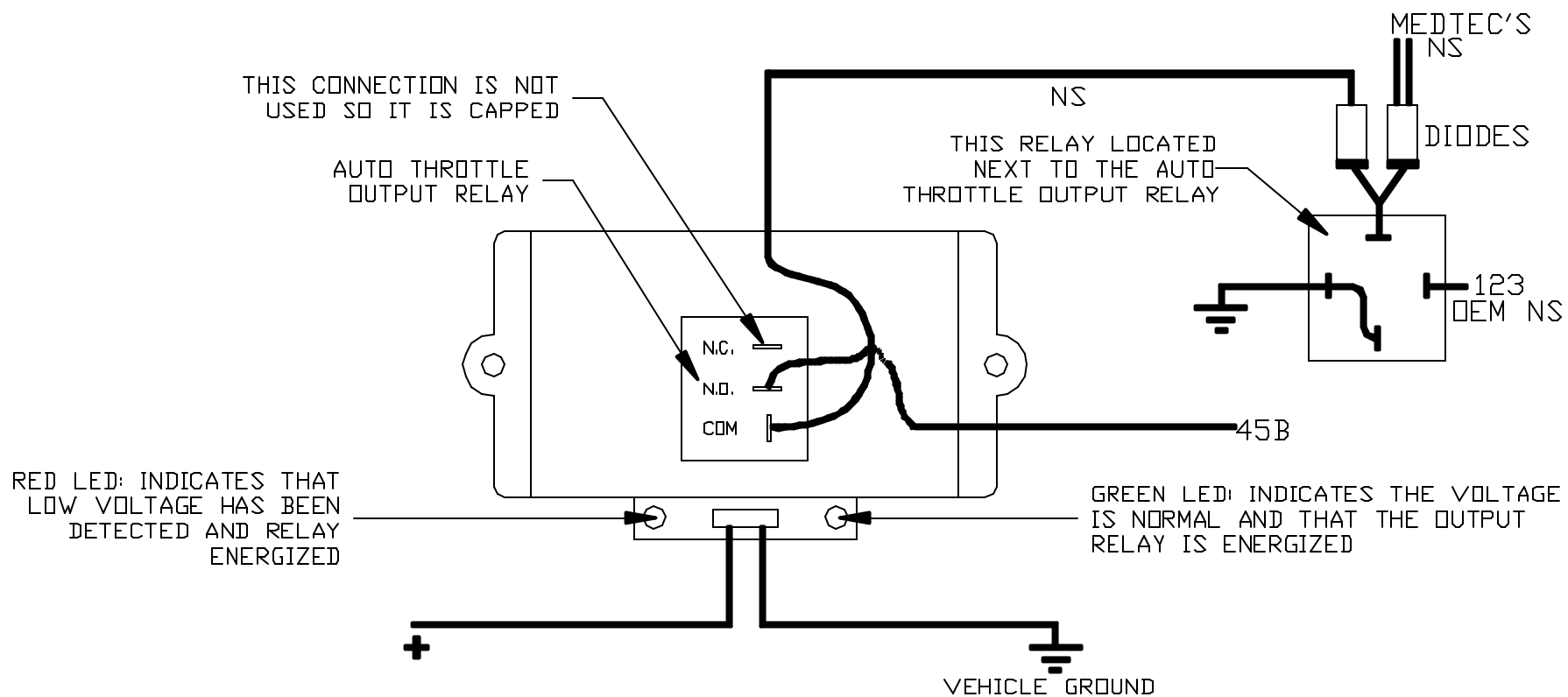
SCALE: FH	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Kussmaul Auto Throttle Wiring for Chevy Diesel		
		DRAWING NUMBER: 15-2.DWG



NOTE:
K97DF, K97CB, & K46A
ARE LOCATED ON THE
OEM COMPUTER MODULE
UNDER THE HOOD

MEDTEC™

SCALE: FH	APPROVED BY:	DRAWN BY: SEB
DATE: 5/14/03	Herman Mullet	REVISED:
PART NAME: Kussmaul Auto Throttle Wiring for International		
		DRAWING NUMBER: 15-3.DWG



NOTE:
45B & 123-NS
ARE LOCATED ON THE
OEM COMPUTER MODULE
UNDER THE HOOD

MEDTEC
A PIERCE COMPANY

SCALE: FH	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Kussmaul Auto Throttle Wiring for Freightliner		
		DRAWING NUMBER: 15-4.DWG

Section 1 — Overview of Heavy-Duty Auto Throttle Controls

Heavy Duty Auto Throttle Applications

Utility and Maintenance Vehicles

Increases engine RPM to provide full current output of the alternator when using various types of DC and AC tools and equipment.

The Auto Throttle is excellent for use with DC to AC inverters that operate electric drills, grinders, exhaust fans and blowers, plastic pipe fusion equipment and engineering test equipment. (Vanner can provide a complete electrical distributing system for utility vehicles using DC to AC inverters, alternator power boosters, battery isolators, and auto throttles.)

Bucket and Boom Trucks - Power Take-Offs

In vehicles with on-board hydraulic systems, the Auto Throttle will increase engine RPM, allowing equipment to operate at maximum efficiency and provide proper operating pressures. The Auto Throttle can be activated by a hydraulic pressure switch, which turns it on when the hydraulic system is engaged.

Emergency Vehicles

Particularly desirable in police cars, fire trucks, ambulances, and other emergency equipment when current exceeds alternator output at idle resulting from operating emergency rotating beacons, flashing warning lights, DC to AC inverters and other electrical equipment.

The Vanner Auto Throttle is activated by an on/off switch (or through the master module disconnect switch on ambulances as mandated by KKK-A-1822D specifications). The Auto Throttle releases the high engine idle instantly when the shift lever is moved to any drive position or when the brake pedal is depressed to prevent the vehicle from surging. It reactivates when the gear shift lever is placed into park or neutral and when the foot brake pedal is released.

Heavy Duty Automatic Throttle System

Vanner's Heavy Duty Auto Throttle features a strong solenoid that can control the RPM's of the toughest diesel engine, under the most extreme environmental conditions. The twenty pound pull power of the Auto Throttle provides positive and constant RPM engine control. A key design feature incorporating a vernier control allowing one-hand, precise adjustment has been built into the Model 73-46. This design feature ensures that the most critical adjustment can be made with ease and accuracy.

Section 2 — Theory of Operation

The solenoid of the 73-46 is a continuous duty, 12-volt utilizing internal dual coils. The first, a pull-in coil, is designed for 12-volt intermittent duty (increasing engine RPM to high idle); while the second; a hold-in coil is designed for continuous duty (maintaining high idle engine RPM). The solenoid plunger is activated by the pull-in coil and bottoms in the solenoid instantly, then is held in this position by the hold-in coil. If the solenoid is operated continuously with the plunger in an unseated position (the pull-in coil operating) the solenoid will burn out in 15 to 30 seconds.

The function of the control module is to sense the brake switch and neutral safety switch. When the foot brake is not depressed or when the vehicle gear shift is in park or neutral, the control module activates the solenoid, causing it to pull in, and the cable to activate the throttle linkage thus increasing the RPM of the engine. Conversely, when wither the foot brake is applied or the vehicle is put into gear, the control module responds and signals the solenoid to release instantly allowing the engine RPMs to reduce to a slow idle.

The wiring circuit functions as follows. The red wire is the power input for the system. It is desirable to keep this wire as short as possible using at least a 12 gauge wire. The white wire carries the power from the control module to the solenoid. The white/red wire carries the signal from the brake switch to the control module. When the brake pedal is depressed, the module then deactivates the solenoid causing the engine RPMs to drop to low idle. The white/black wire of the control module picks up a ground signal from the neutral safety switch. When the neutral safety switch is in park or neutral, the control module sees ground, and signals the solenoid to energize thus increasing the RPMs to a fast idle. The reverse happens when the neutral safety switch senses the vehicle being placed in gear. The ground is not seen and the signal is sent to the control module, which causes the solenoid to deactivate. Whenever the solenoid energizes, the system will draw high amperage for a split second (the time it takes the solenoid plunger to bottom out) then will reduce to a minimum draw for as long as the solenoid is activated. It is done this way to reduce the power required for operation and to get the most strength out of a relatively small solenoid.

Section 3 — Troubleshooting

The first thing to check is the cable (Aut-09) going to the throttle linkage. If the cable housing was melted by the exhaust manifold or otherwise damaged to a point where the stainless steel cable is jammed in the housing, the cable won't work and must be replaced.

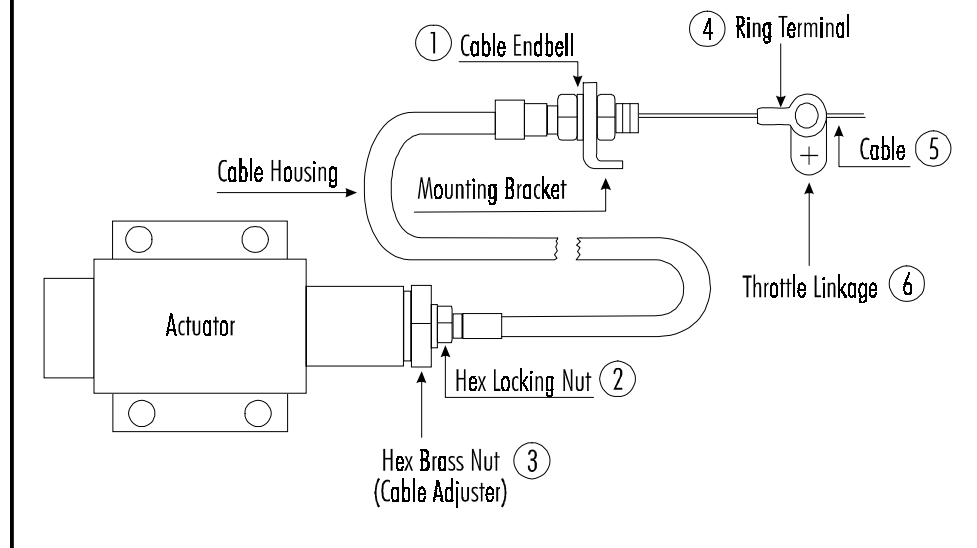
The rest of the troubleshooting involves the electrical circuits. First test the solenoid. With the engine OFF, disconnect the white wire where it is connected to the positive (+) terminal on the solenoid (Aut 0-11). Using a fused 50-amp jumper, apply (+) 12 volts through a 50A ammeter to the positive (+) terminal of the solenoid. Be certain that the negative terminal of the solenoid is securely grounded. The solenoid is operating properly if the plunger pulls in, (audibly bottoms out) and the ammeter reading is between 0.5 and 1.0 amps. You should observe a momentary surge of up to 45 amps before the needle settles at the

0.5 to 1.0 amp reading. If the plunger does not pull in, and you see a 0.5 to 1.0 amp reading, the solenoid is not functioning correctly and must be replaced. If the plunger does pull in and bottoms out, but your amp reading is outside the above ranges, the solenoid is not functioning properly and must be replaced. This completes the electrical test of the solenoid.

Connect the 50A ammeter, positive to the end of the white wire from the control module and negative to the positive (+) terminal of the solenoid. Activate the Auto Throttle system either by turning the ignition switch "on" or through an auto throttle auxiliary on/off-switch if one has been installed. If the system is functioning normally, the solenoid may bottom. You must continue testing to confirm if all components are operating properly. Using a voltmeter (meter negative connected to the chassis) connect meter positive, first to the red wire from the control module. You should measure 12 volts on the red wire. If the reading is less than battery voltage, then check the red wire circuit for a blown fuse, defective on/off switch, etc. Next connect the meter positive to the white/black wire from the control module. The voltmeter should read less than 2 volts. If the reading is 2 to 8 volts, there is a conflicting electrical circuit in the vehicle system and we recommend that a double pole, double throw relay be installed in the neutral safety switch circuit to isolate the two conflicting systems. If the reading is above 8 volts, you should check for an open neutral safety switch condition, a broken white/black wire, etc. For the final volt meter test, measure the voltage on the white/red wire; you should read not more than 2 volts. A reading exceeding 2 volts indicates an incorrect connection of the white/red wire at the brake switch. This connection should be made on the brake light side of the brake switch.

To test the brake disable, apply the brake; the ammeter should drop to zero. Release the brake and the ammeter will reflect a momentary surge of up to 45 amps then drop back to 0.5 to 1.0 amps. If this test fails, the problem is in the control module (Asm-43). Replace the module.

As a final check of the neutral safety switch circuit, secure the vehicle by setting the parking brake and blocking the wheels. Activate the 73-46 (solenoid will bottom) with the engine OFF. Drop the gearshift lever into drive. The solenoid should release. If it does not release it may be due to (1) a non-functioning control module, (2) a misaligned or shorted neutral safety switch, or (3) a partial grounding of the white/black wire through the vehicle's normal wiring system. First, disconnect the white/black wire at the neutral safety switch. If the solenoid disengages, the control module is functioning normally. If the solenoid remains in a seated position, replace the control module. To check for a misaligned or shorted neutral safety switch, refer to the manufacturer's test procedures. If (1) and (2) check properly, then correct (3) by installing a double pole, double throw relay circuit to isolate the two conflicting systems.

Figure 2 - Adjustment Procedure — Auto Throttle Model 73-46

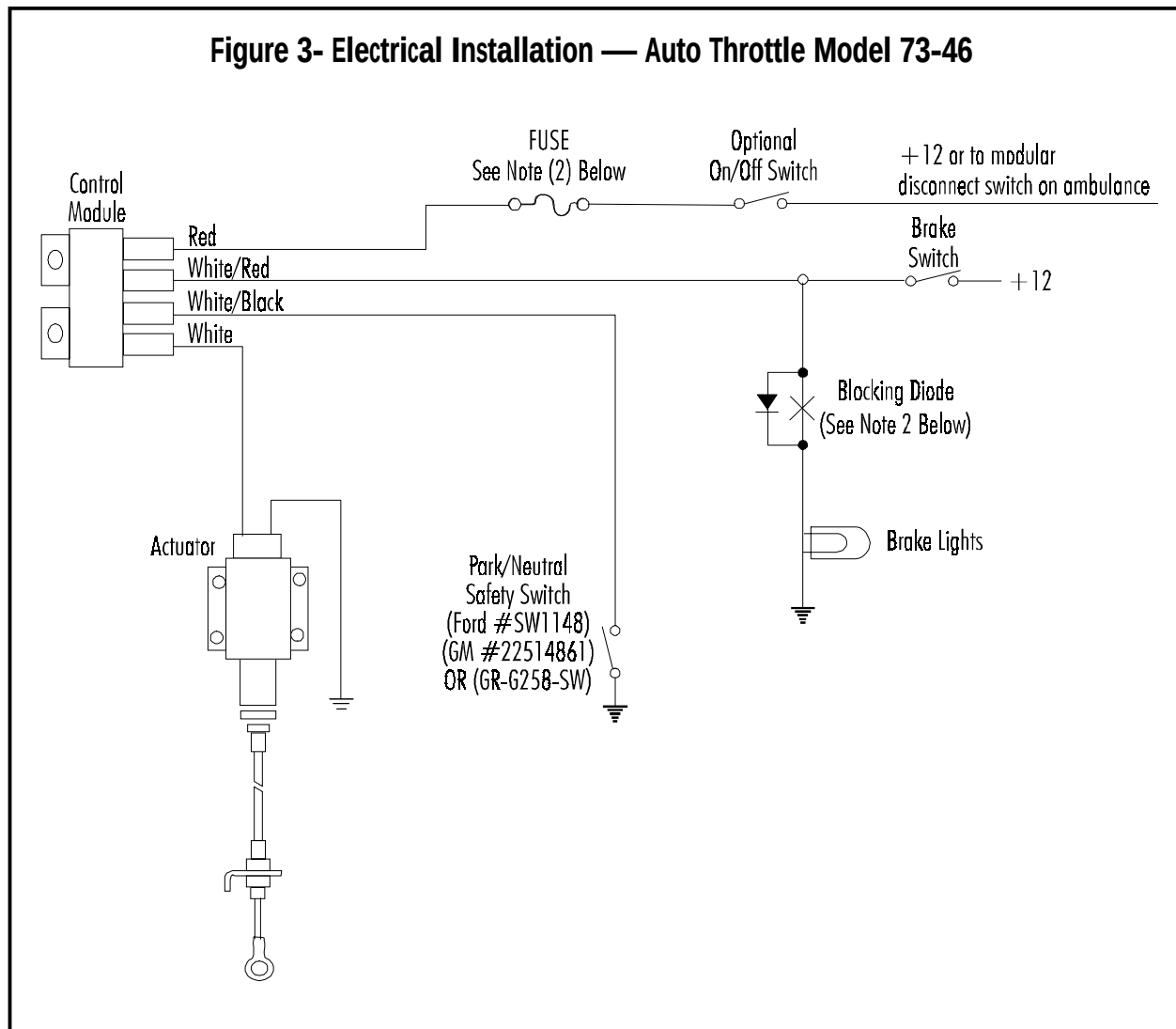
Idle RPM Adjustment

1. With the engine off, lock the cable endbell (1) to the mounting bracket to prevent the cable housing from turning during adjustment.
2. Insert cable through ring terminal; do not crimp terminal eye, allowing cable to move freely.
3. Release the hex locknut (2). Turn the brass cable adjuster (3) counterclockwise until it is fully inserted in the actuator.
4. With the engine OFF, actuate the solenoid.
5. With the throttle linkage (6) in the idle position, eliminate all slack in the cable (5).
6. Secure the cable (5) to the throttle linkage (6) by crimping the ring terminal (4).

High RPM Adjustment

1. Start the engine.
2. With the engine running and the AUTO THROTTLE engaged, turn the brass adjuster nut (3) clockwise. Turning the adjuster clockwise will cause the cable (5) to tighten and bring the throttle off idle. Continue to adjust the nut until the desired RPM is achieved.
3. Secure the setting by tightening the hex locking nut (2).

NOTE: The Adjuster is designed to float in the solenoid. This freedom insures that there is no adverse torque or twisting on the control cable.

Figure 3- Electrical Installation — Auto Throttle Model 73-46

NOTE 1: On vehicles where turn signal and hazard warning lights are incorporated with the red stop light filaments, cut the wire as shown and install a BLOCKING DIODE.

A bridge rectifier (Radio Shack #276-1185 or Westinghouse MB12A25V05) can be used in place of the blocking diode.

NOTE 2: The Vanner Model 73-46 Auto Throttle incorporates a dual coil solenoid. The first is a low current holding coil that will keep the solenoid actuated once set. The second is a high current pull-in coil. An internal switch disconnects the second coil when the solenoid plunger completes its stroke. If the plunger is not allowed to bottom out or complete its stroke, the internal switch will not disconnect the high current coil and the solenoid will burn out in about 30 seconds. Therefore, the Auto throttle installation must include fuse protection A SLOW-BLO 3AG 8 Amp fuse is recommended.

Model—73-46

A Heavy Duty Automatic Throttle System consisting of the solenoid/cable assembly and the control module assembly.

Model—73-48

The 73-48 Installation Kit consists of an ON/OFF toggle switch, 02264* isolation diode, fuse, and fuse holder.



Heavy Duty Auto Throttle System
Model 73-46

Replacement Parts

<i>Part Number</i>	<i>Description</i>
02264	25 amp bridge rectifier
73-44	73-46 solenoid and 46" cable assembly
02031	Control module with harness
02045	Solenoid without cable assembly
05235	30 amp Relay ('96 Chevy Diesel 6.5L)
B00167	46" Cable Assembly
05006	Ring Terminal 1/4"

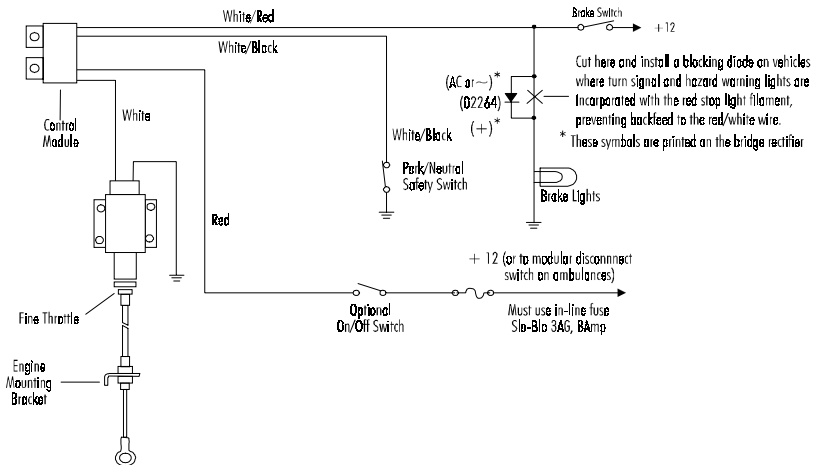
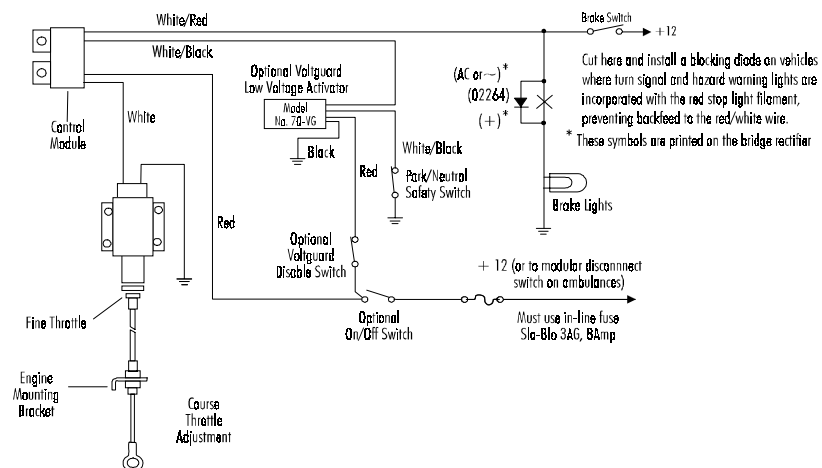
Conserve Fuel and Eliminate Over-Revving With the Volt Guard Low Voltage Actuator

When your battery is fully charged the Volt Guard allows the engine to idle until the voltage drops to 12.5 volts. It then automatically activates the Auto Throttle until the battery has reached approximately 13.8 volts at which time the throttle is released after approximately 90 seconds. The Volt Guard automatically repeats this process as often as necessary.



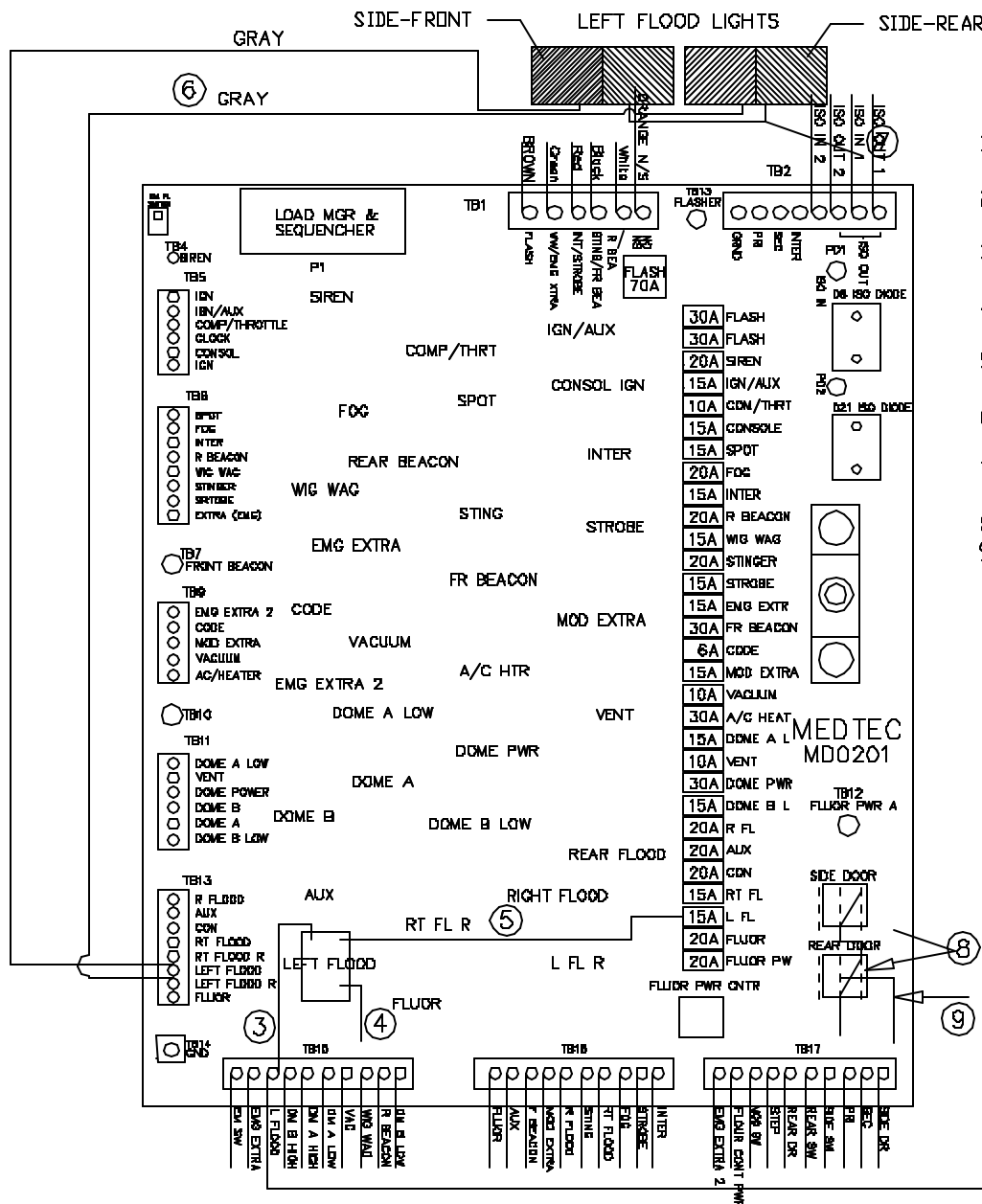
Volt Guard Low Voltage Actuator
Model 70-VG

The Volt Guard can be used with Vanner as well as many other makes of automatic throttle controls provided they are electrically activated (see wiring chart on back).

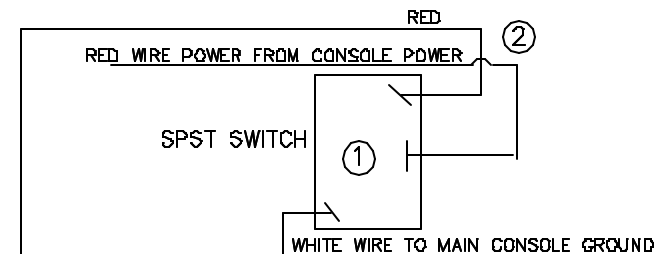
Figure 1a - Automatic Throttle System Without Optional Volt Guard**Figure 1b - Automatic Throttle System With Optional Volt Guard**

* Necessary for vehicles incorporating rear turn signal lamp with stoplight function. Not required if red/white stripe wire is connected to the Center High Mount Stop Light (CHMSL) circuit. May substitute Radio Shack #276-1185 or Westinghouse #MB12A25V05.

Complete installation instructions on following pages.



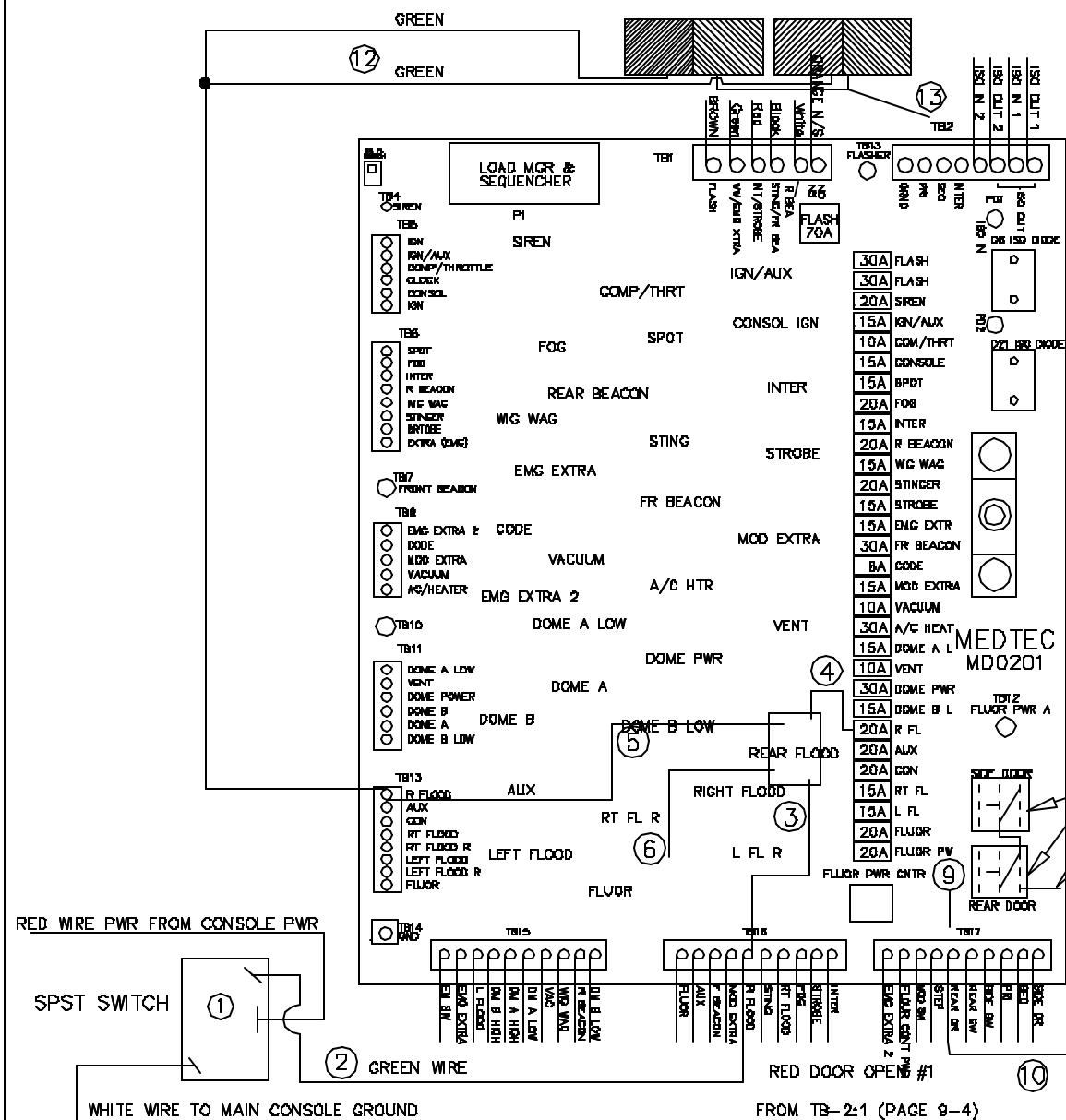
1. LEFT FLOOD SWITCH LOCATED IN FRONT CONSOLE
2. RED WIRE FROM SPST SWITCH TO TERMINAL L FL 'IN'
3. COPPER LEAD FROM TERMINAL L FL 'IN' TO 20 AMP L FL RELAY
4. COPPER LEAD FROM 20 AMP L FL RELAY TO GROUND
5. COPPER LEAD FROM 15 AMP BREAKER TO 20 AMP L FL RELAY
6. GRAY WIRE FROM TERMINAL L FL 'OUT' TO LEFT FLOOD LIGHTS
7. WHITE GROUND WIRE TO MAIN GROUND BAR
8. 3 AMP RELAYS FOR LIGHTS
9. COPPER LEAD TO LIGHT RELAY DIODES



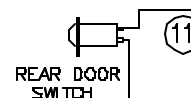
MEDTEC <i>A PIERCE COMPANY</i>		
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DATE: 8/20/02	Herman Mullet	REVISED:
PART NAME: Left Flood Light		
MD0201		DRAWING NUMBER: 16-1.DWG

16-2

REAR FLOOD LIGHTS



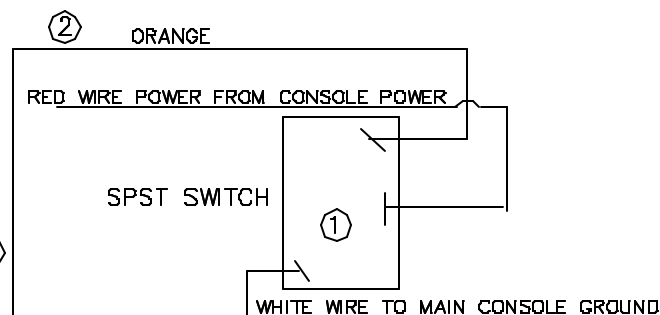
1. REAR FLOOD SWITCH LOCATED IN FRONT CONSOLE
2. RED WIRE FROM SPST SWITCH TO TERMINAL R FL "IN"
3. COPPER LEAD FROM TERMINAL R FL "IN" TO 20 AMP R FL RELAY
4. COPPER LEAD FROM 20 AMP R FL RELAY TO 20 AMP BREAKER TO 20 AMP R FL RELAY
5. COPPER LEAD FROM 20 AMP R FL RELAY TO TERMINAL R FL "OUT"
6. COPPER LEAD FROM 20 AMP R FL RELAY TO GROUND
7. 10 AMP RELAYS FOR LIGHTS
8. COPPER LEAD FROM REAR DOOR RELAY TO TERMINAL RD SW "IN"
9. COPPER LEAD FROM LIGHT RELAYS TO GROUND
10. COPPER LEAD FROM TERMINAL RD SW "IN" TO REAR DOOR SWITCH
11. GROUND FOR REAR DOOR SWITCH FROM MAIN GROUND BAR
12. COPPER LEAD FROM TERMINAL R FL "OUT" TO REAR FLOOD LIGHTS
13. WHITE GROUND WIRE TO MAIN GROUND BAR



MEDTEC
A PIERCE COMPANY

SCALE: Ft	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 8/20/02		REVISED:
PART NAME: Rear Flood Lights		
MD0201		DRAWING NUMBER 16-2.DWG

1. RIGHT FLOOD SWITCH LOCATED
IN FRONT CONSOLE
2. ORANGE WIRE FROM SPST SWITCH
TO TERMINAL RT FL "IN"
3. COPPER LEAD FROM TERMINAL RT FL
TO 20 AMP RT FL RELAY
4. COPPER LEAD FROM 15 AMP BREAKER
TO 20 AMP RT FL RELAY
5. COPPER LEAD FROM 20 AMP RT FL RELAY
TO TERMINAL RT FL "OUT"
6. COPPER LEAD FROM 20 AMP RT FL RELAY
TO GROUND
7. COPPER LEAD TO LIGHT RELAY DIODE
8. 3 AMP RELAYS FOR LIGHTS
9. PURPLE WIRE FROM TERMINAL RT FL "OUT"
TO RIGHT FLOOD LIGHTS
10. WHITE GROUND WIRE
TO MAIN GROUND BAR
11. SIDE DOOR RELAY TO TERMINAL STEP "IN"
TO MAIN GROUND BAR

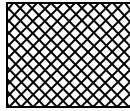


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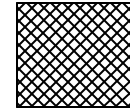
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PART NAME: Right Flood Light		
		DRAWING NUMBER: 16-3.DWG

16-4

SCENE LIGHT

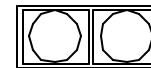
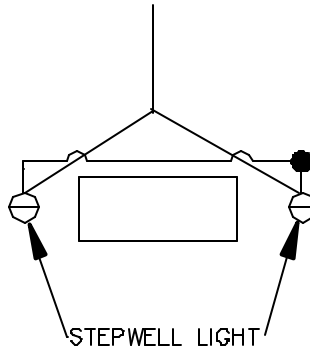
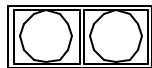


SCENE LIGHT



POWER FOR STEPWELL LIGHT
FROM REAR FLOOD CIRCUIT

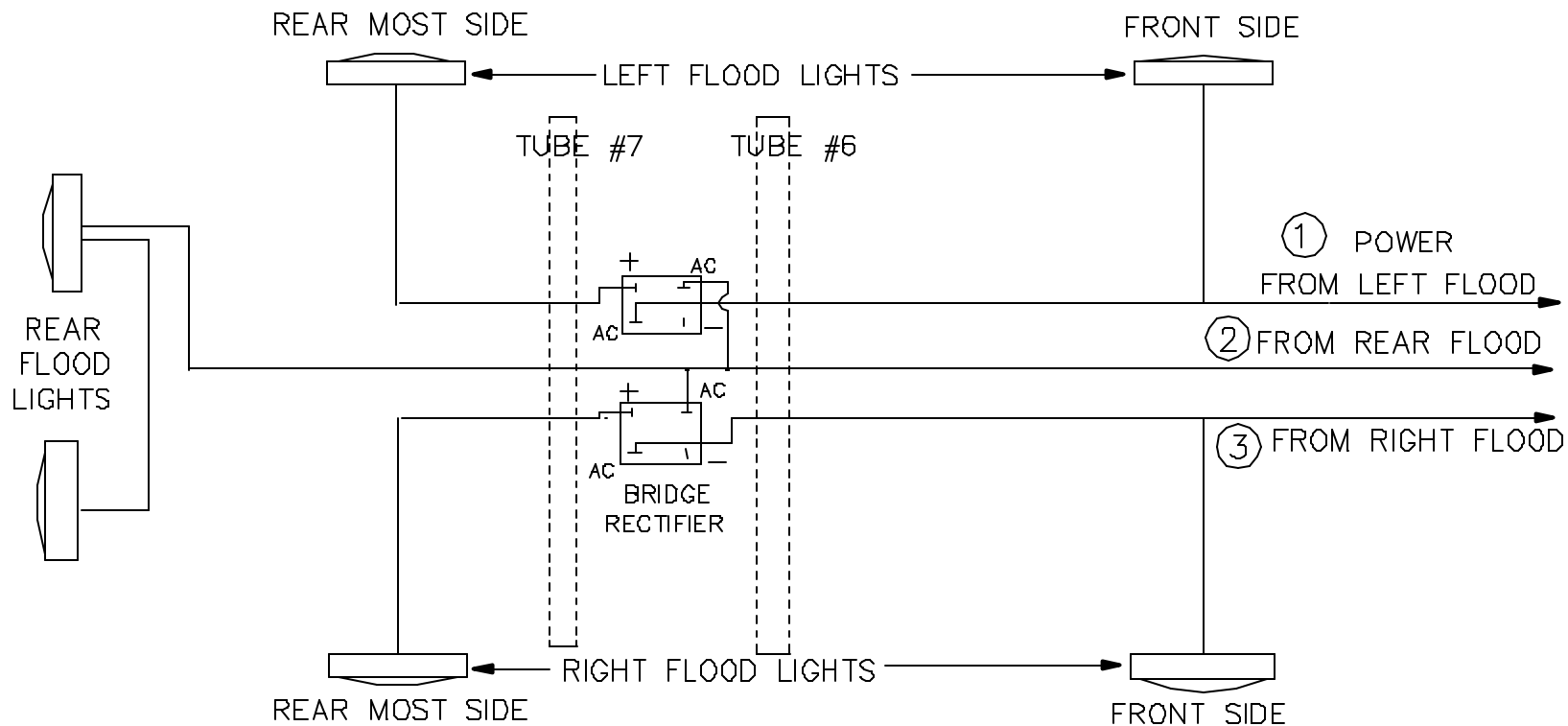
GROUND TO FRAME UNDER TRUCK



MEDTEC
A FIERCE COMPANY

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DATE: 4/17/01		REVISED:
PART NAME: REAR Stepwell Light		
		DRAWING NUMBER: 16-4.DWG

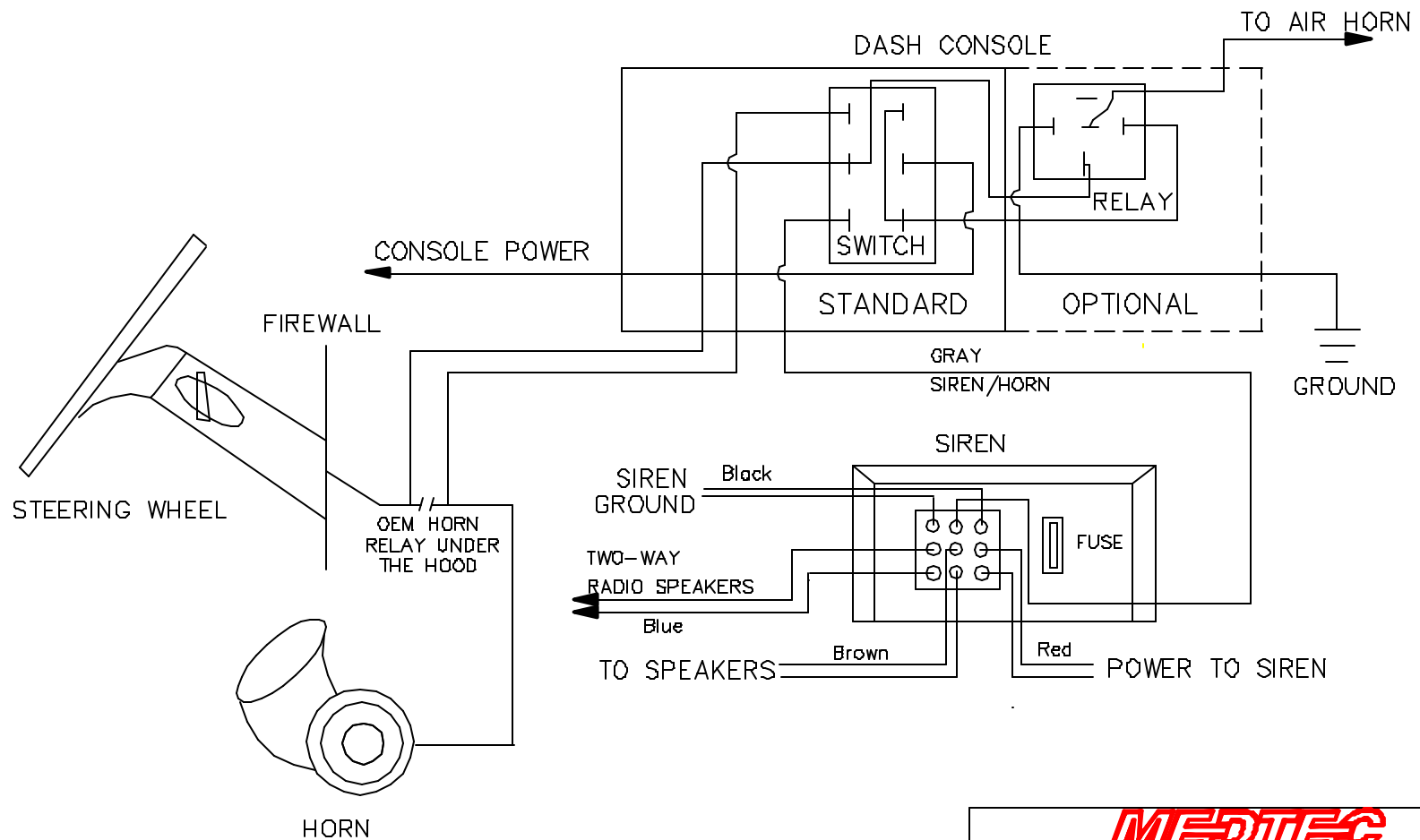
16-5



1. WIRE FROM LEFT FLOOD ON PC BOARD TO LEFT FLOOD LIGHTS
2. WIRE FROM REAR FLOOD ON PC BOARD TO REAR FLOOD LIGHTS
3. WIRE FROM RIGHT FLOOD ON PC BOARD TO RIGHT FLOOD LIGHTS

MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: To Activate Rear Most Side Lights In Reverse 98 - OLDER		
		DRAWING NUMBER: 16-5.DWG

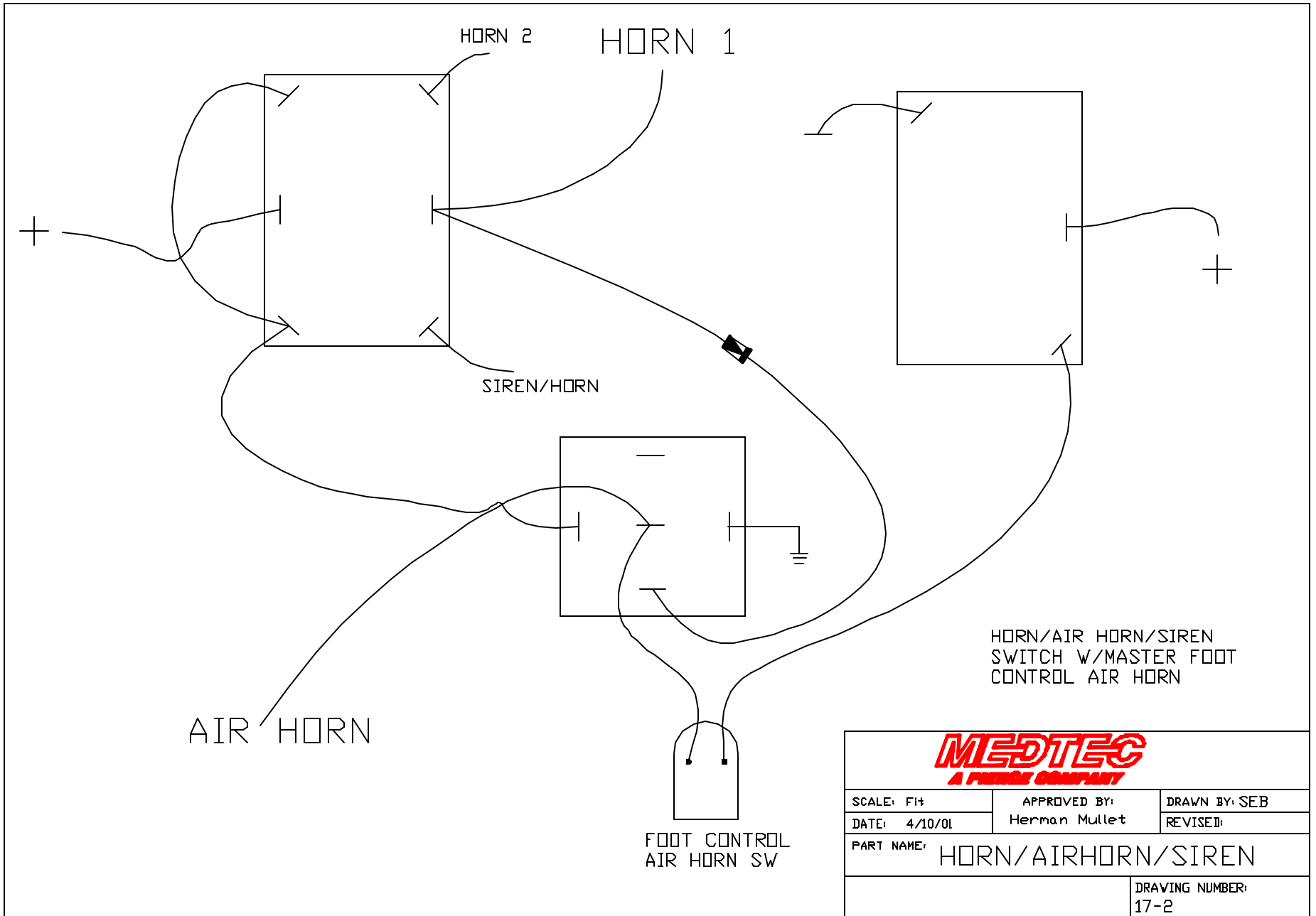
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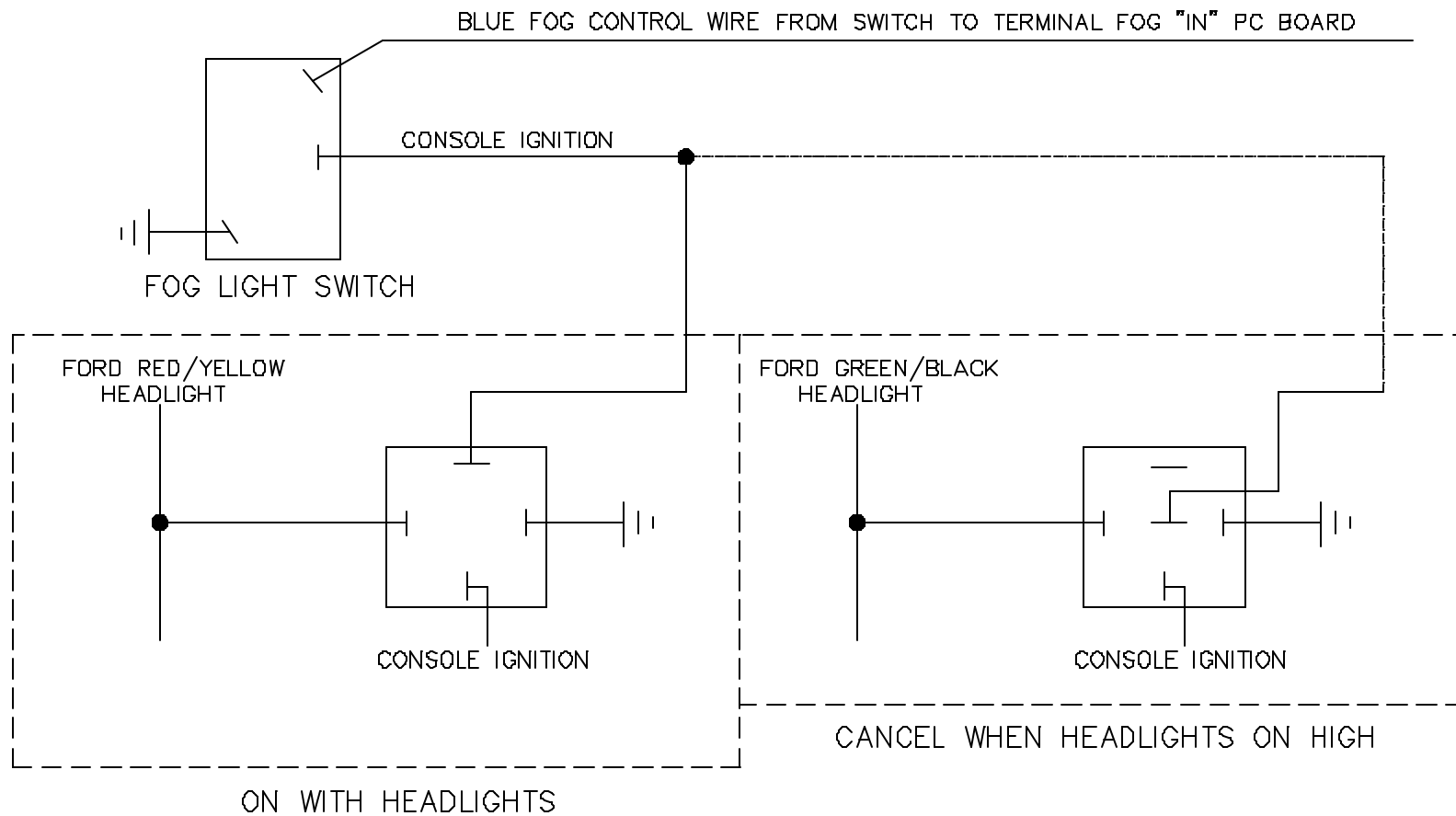
MEDTEC
A FERRIS COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
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PART NAME: Horn Ring: Siren/Horn/Air Horn		
		DRAWING NUMBER: 17-1.DWG

17-2



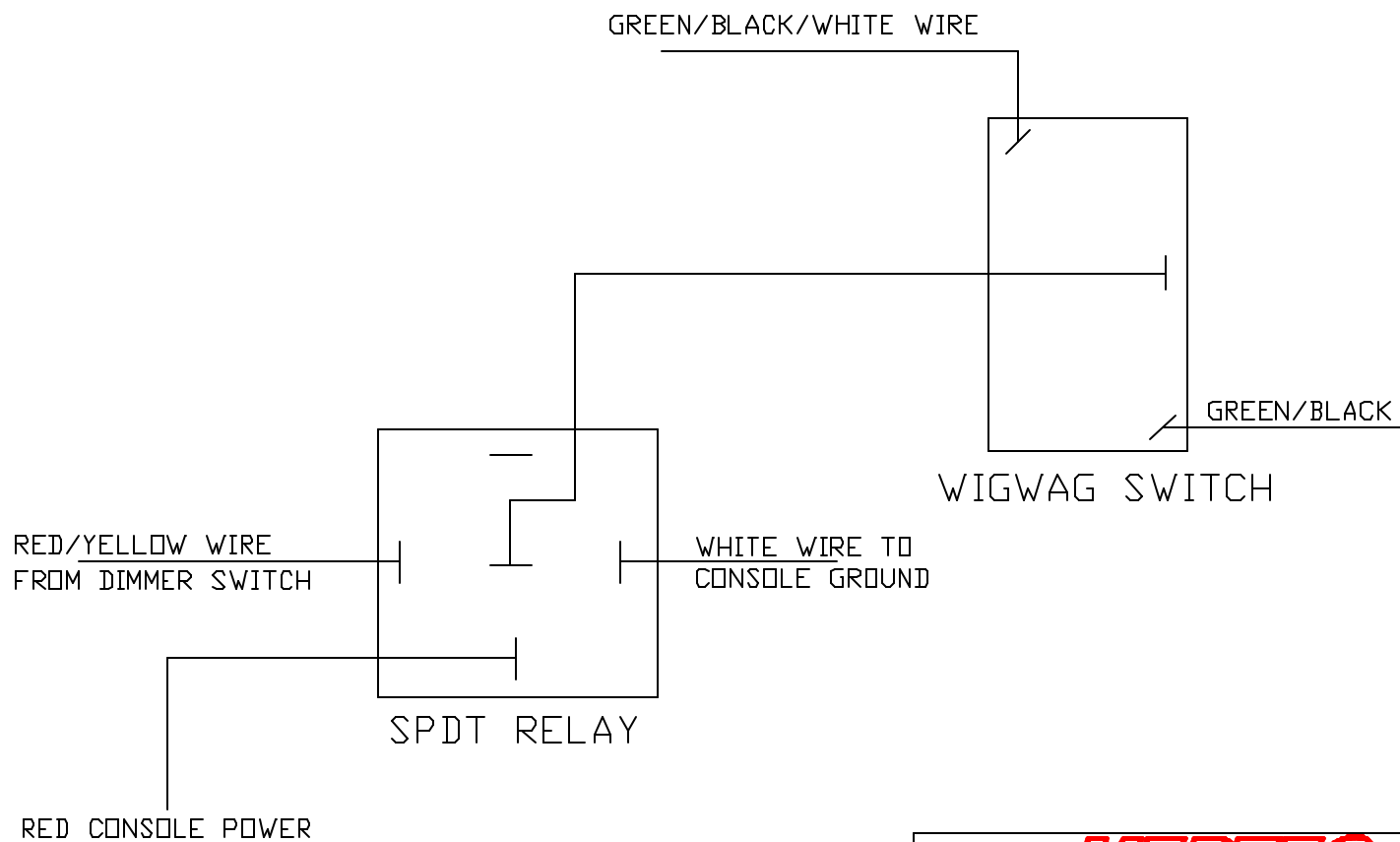
17-3



MEDTEC A FORD COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
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PART NAME: Fog Lights on Only When Running Lights are Activated		
		DRAWING NUMBER: 17-3.DWG

17-4

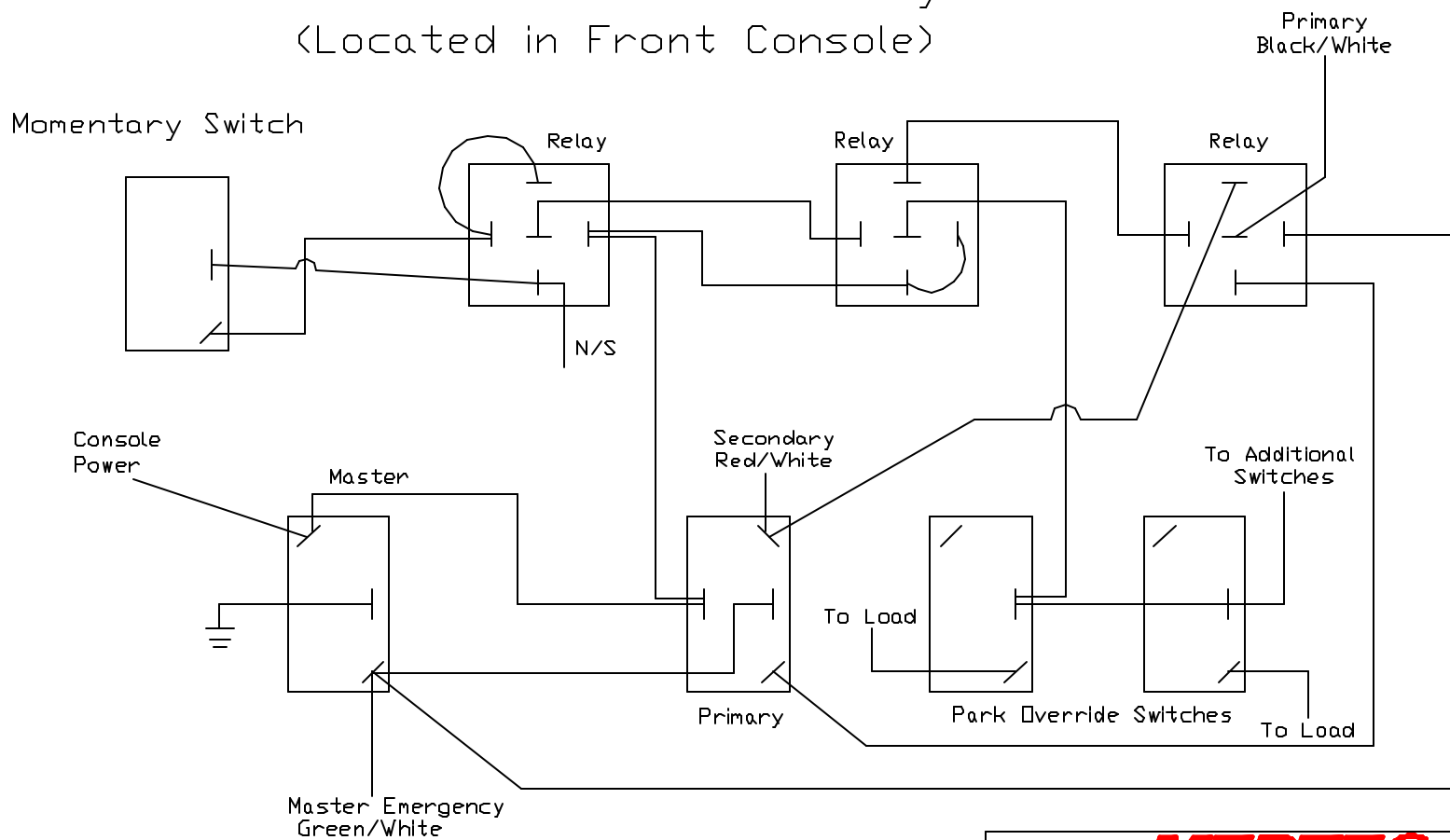
FORD



MEDTEC
A PERCEC COMPANY

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		DRAWING NUMBER: 17-4.DWG

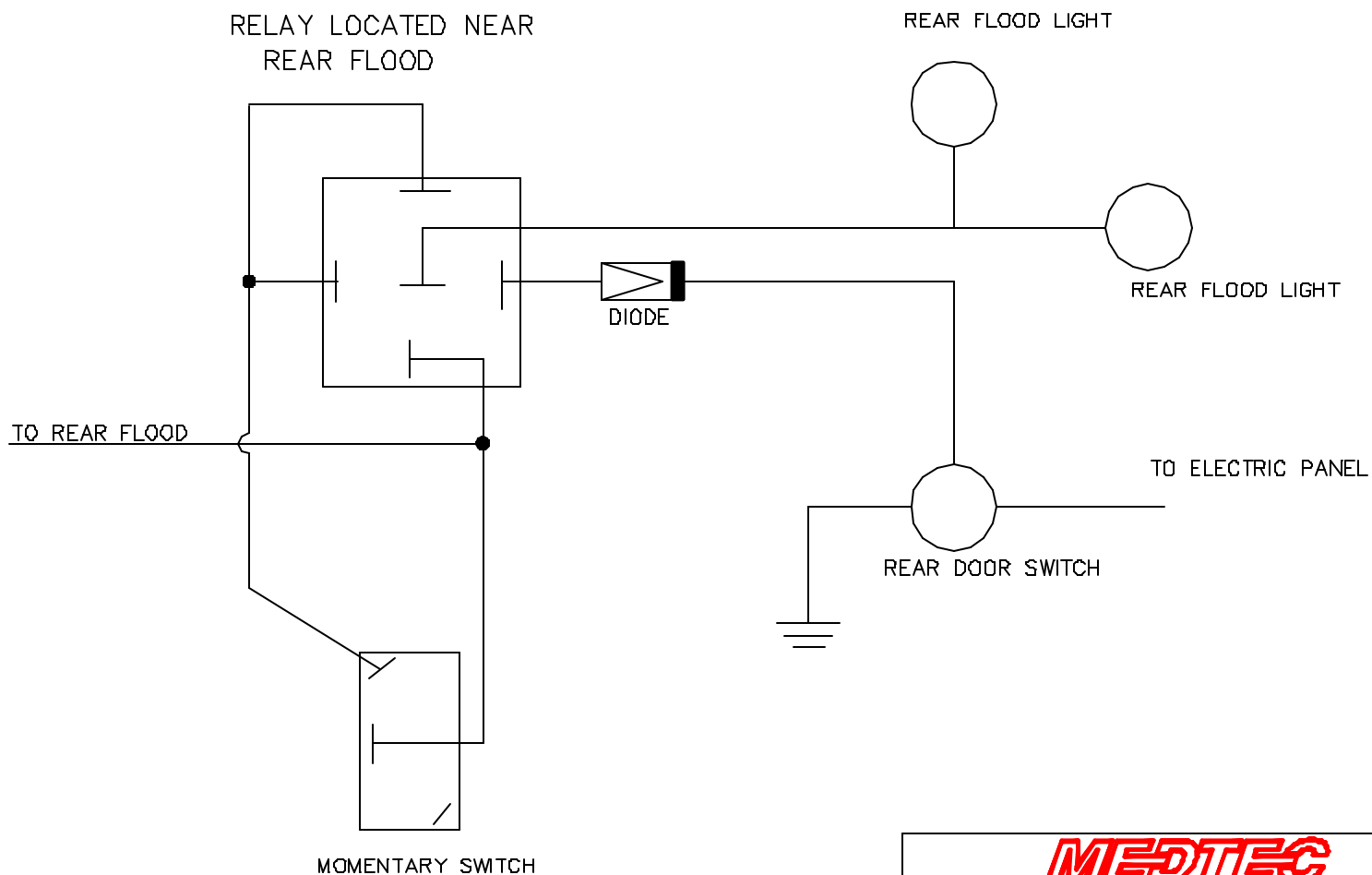
Park Override with Momentary Switch (Located in Front Console)



17-5

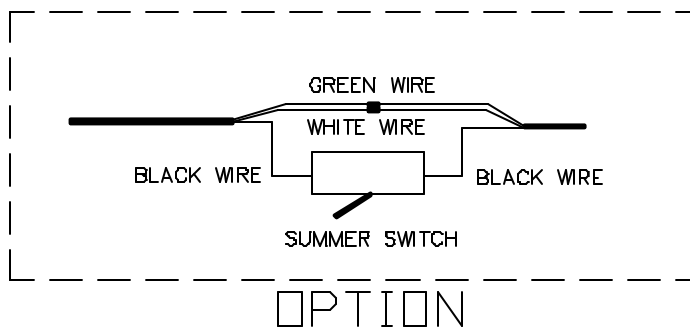
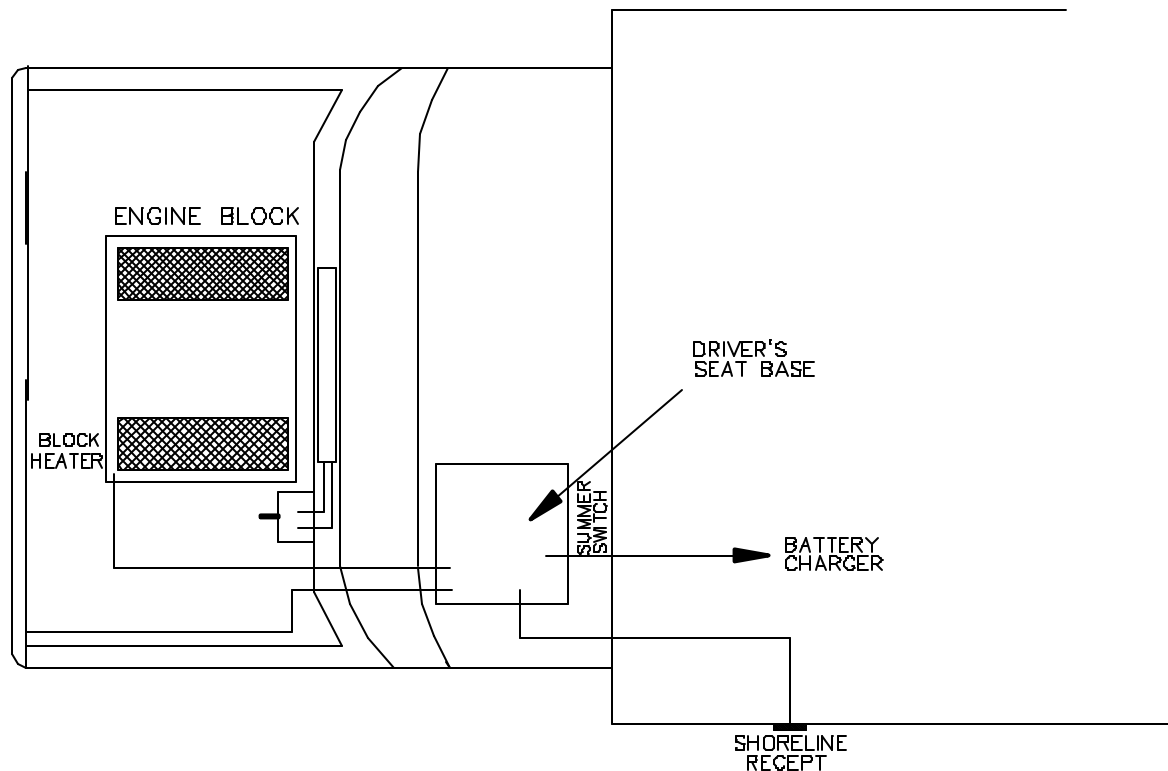
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		DRAWING NUMBER: 17-5.DWG

17-6



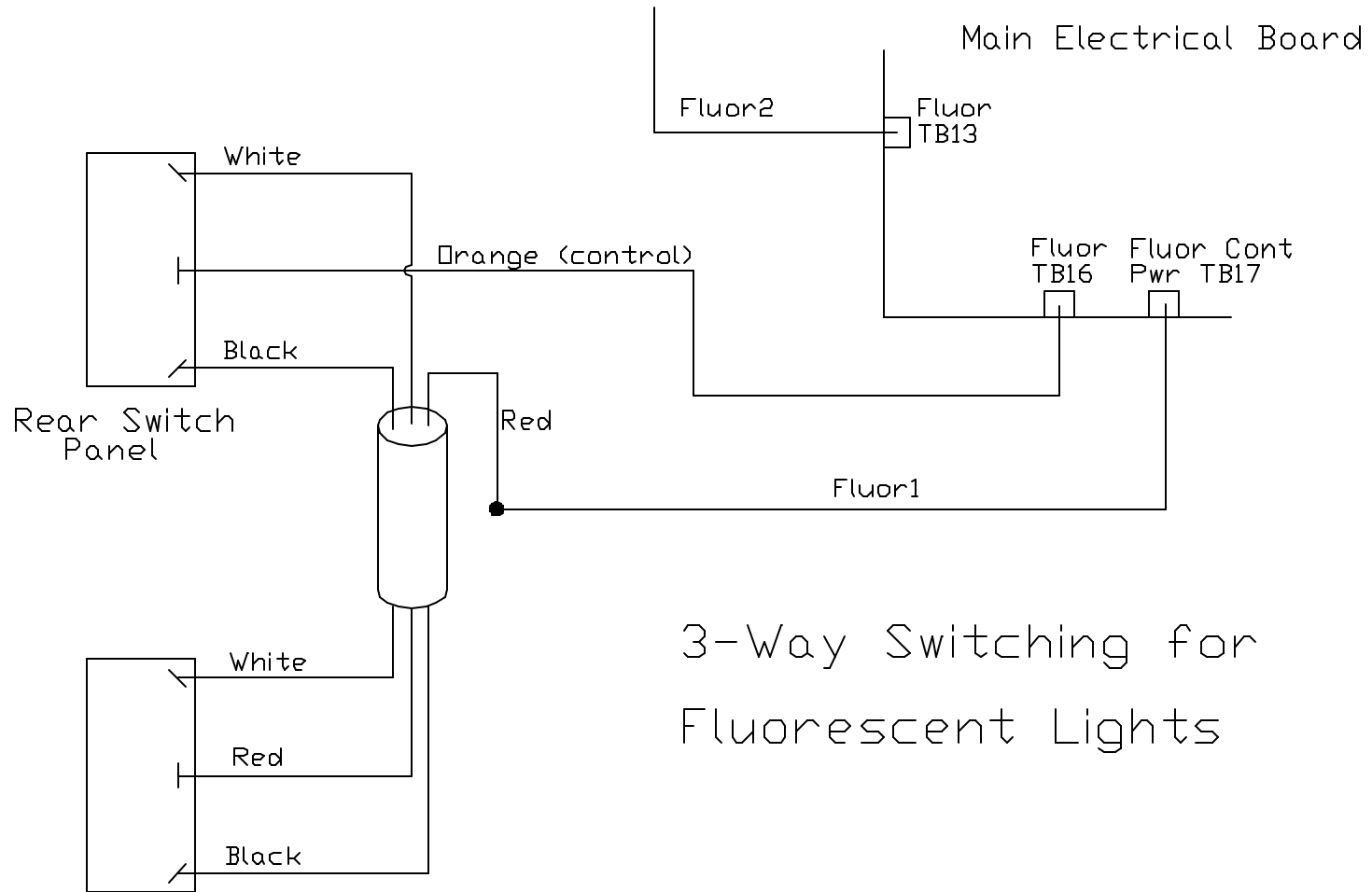
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DATE: 4/17/01	Herman Mullet	REVISED
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		DRAWING NUMBER: 17-6.DWG

17-7



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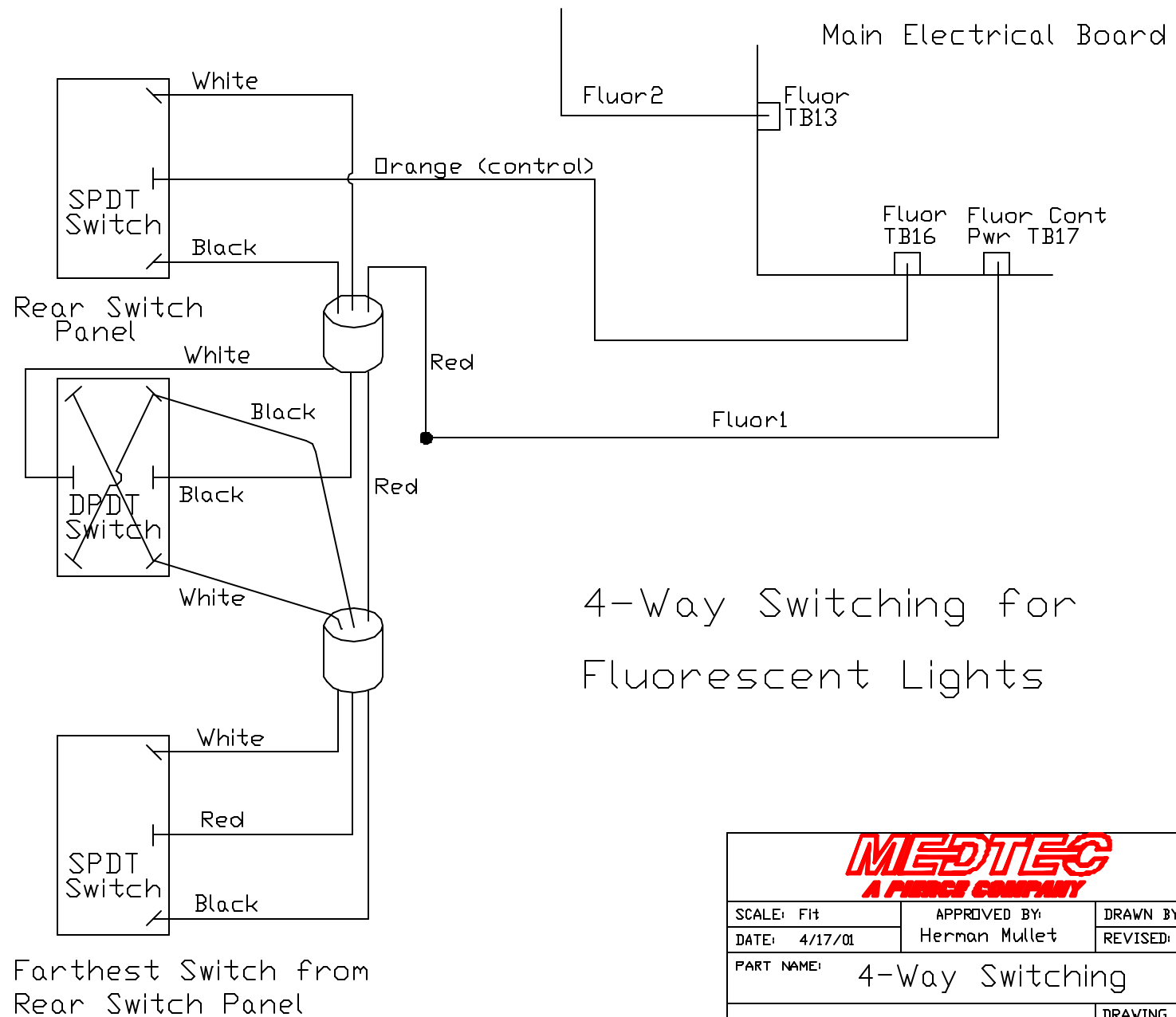
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DATE: 4/17/01	Herman Mullet	REVISED
PART NAME: Block Heater Summer Switch		
		DRAWING NUMBER: 17-7.DWG



3-Way Switching for Fluorescent Lights

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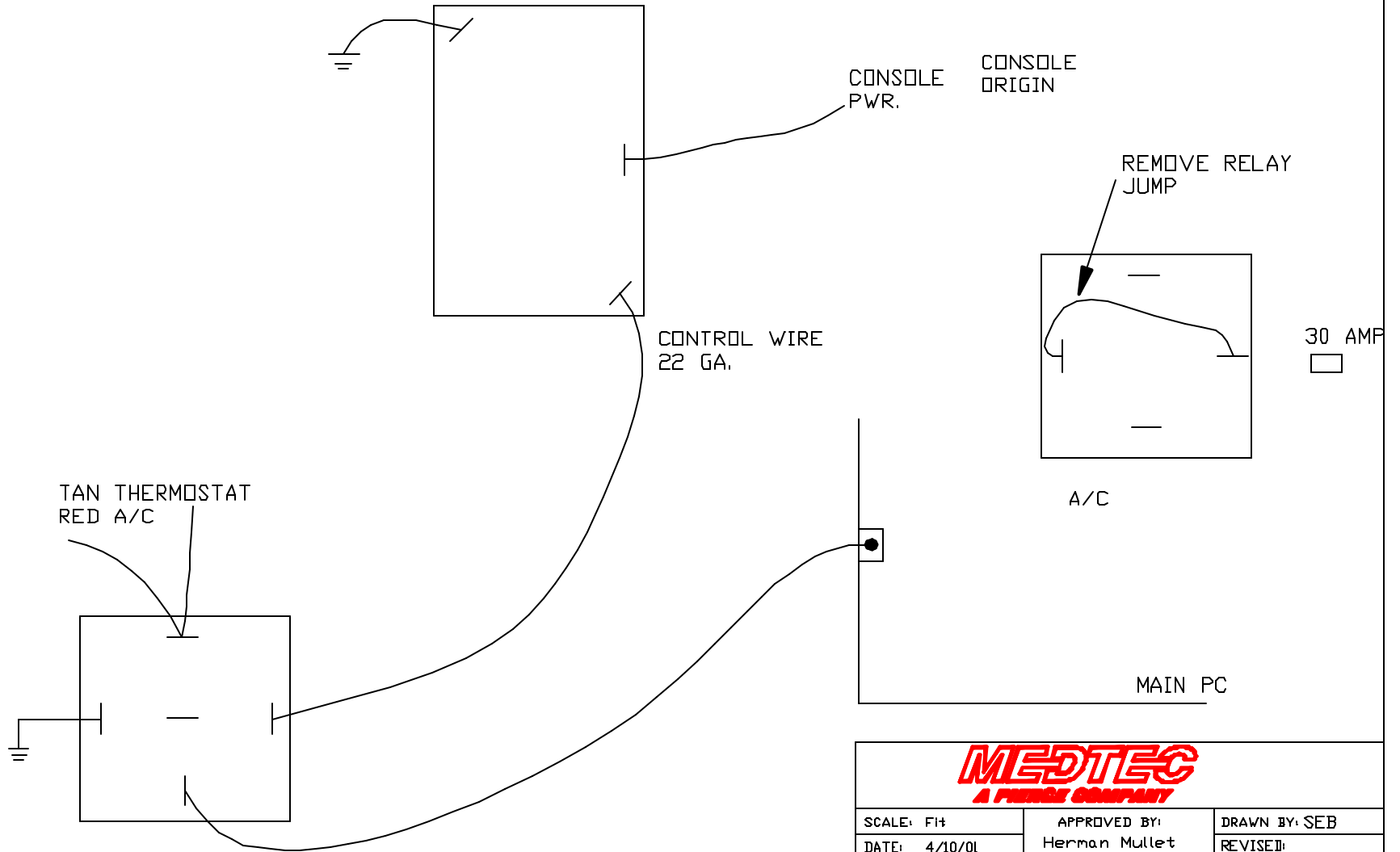
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DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: 3-Way Switching		
Self Diagnostic		DRAWING NUMBER: 3WAYSWT1.DWG



MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: 4-Way Switching		
Self Diagnostic		DRAWING NUMBER: 17-9.DWG

17-10

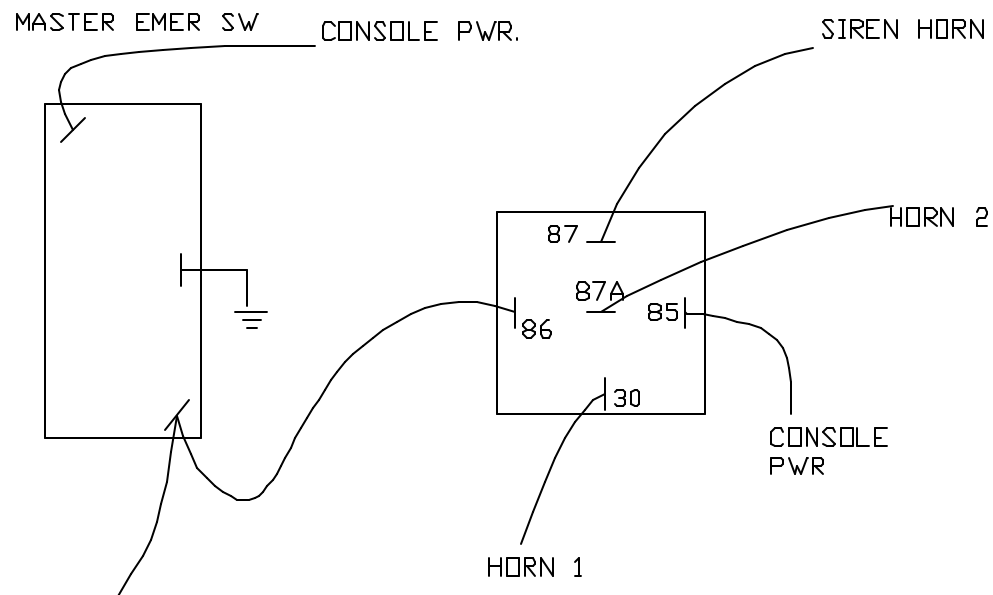


IN ELECT CABINET

MEDTEC
A FERRIS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/10/01	Herman Mullet	REVISED:
PART NAME:		
FRONT CONSOLE MASTER HEAT A/C SW		
	DRAWING NUMBER:	
	17-10.DWG	

17-11

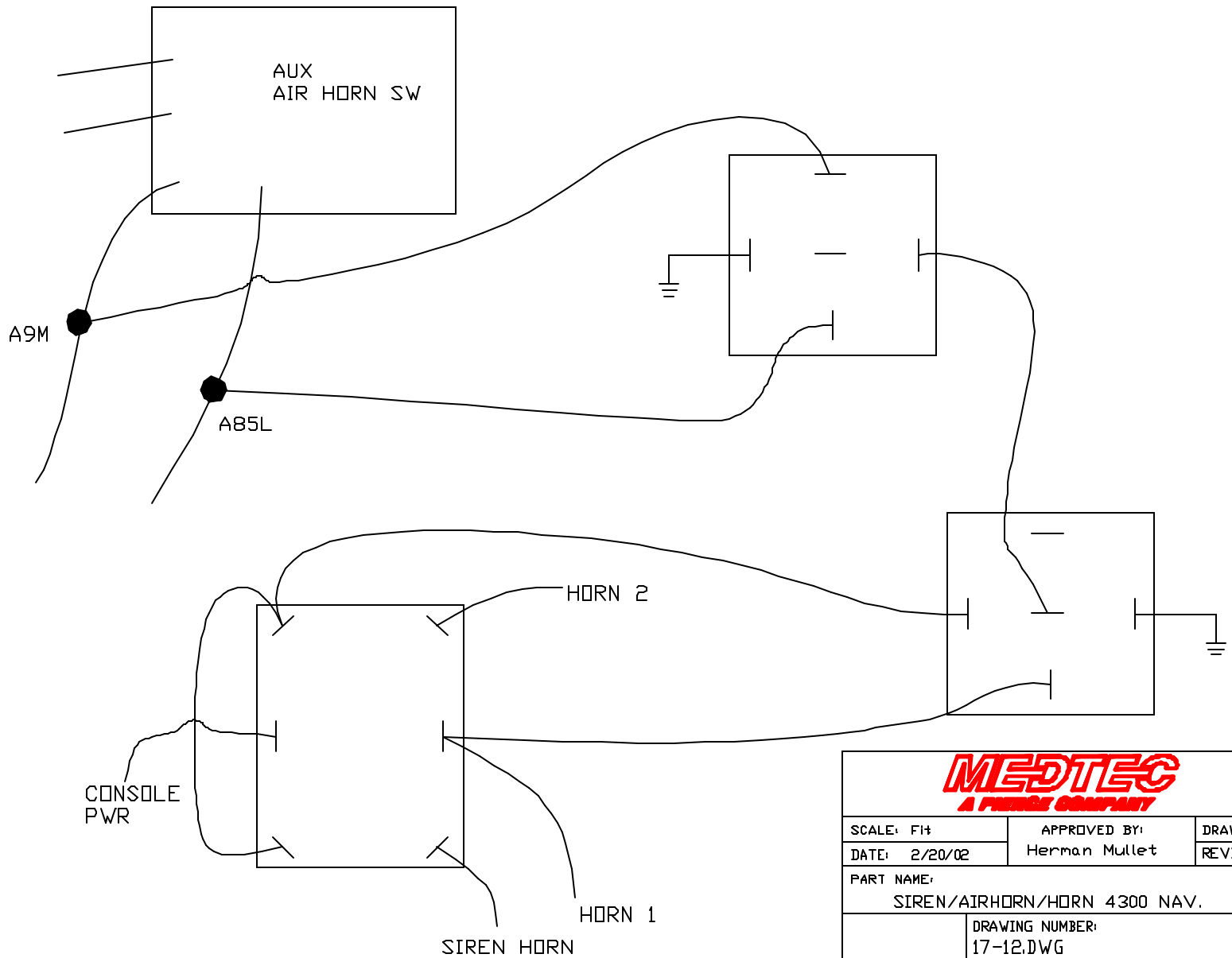


HORN RING TO ACTIVATE SIREN
WHEN EMER LIGHTS ARE ON

MEDTEC
A FERRIS COMPANY

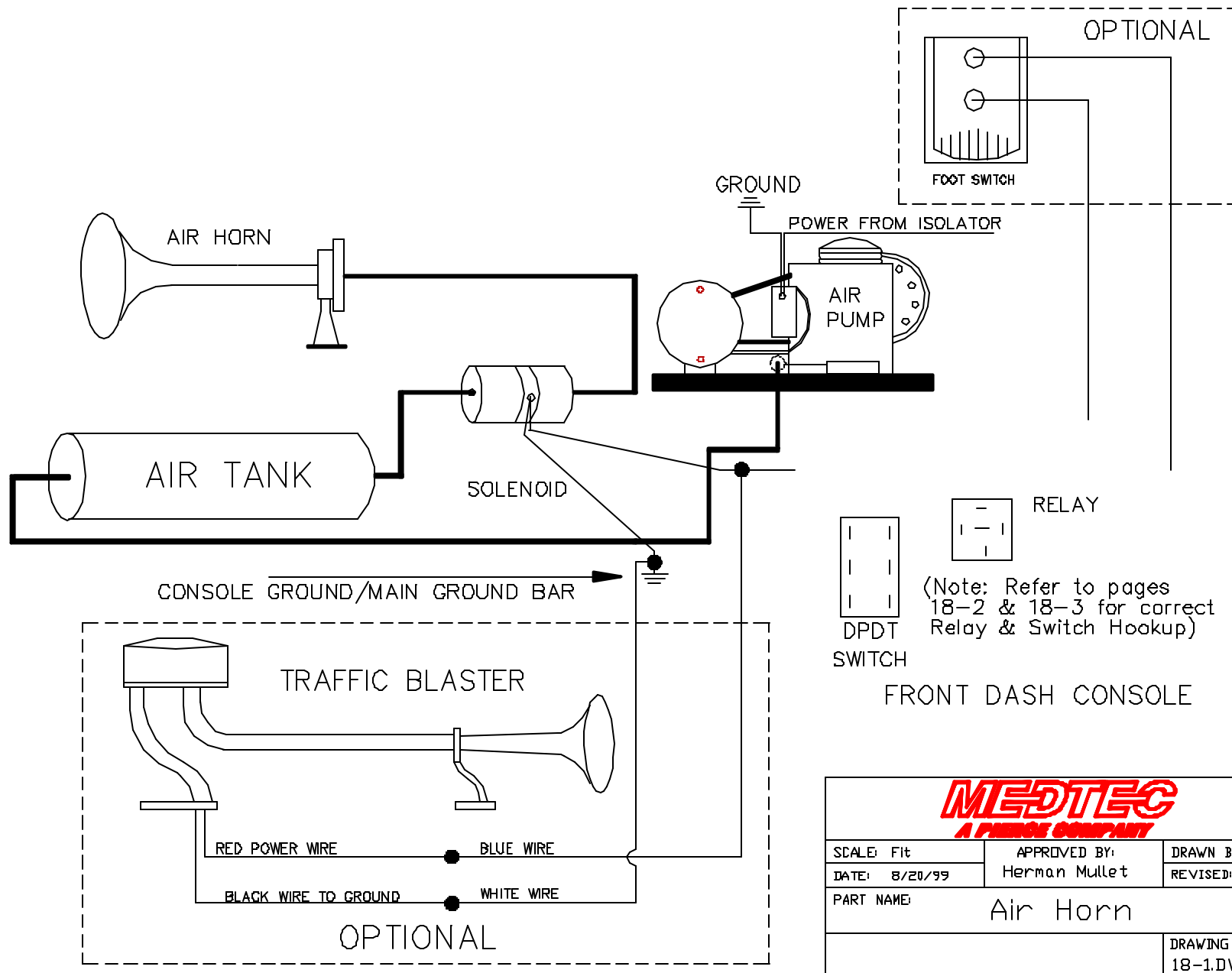
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	DRAWING NUMBER: 17-11.DWG	

17-12



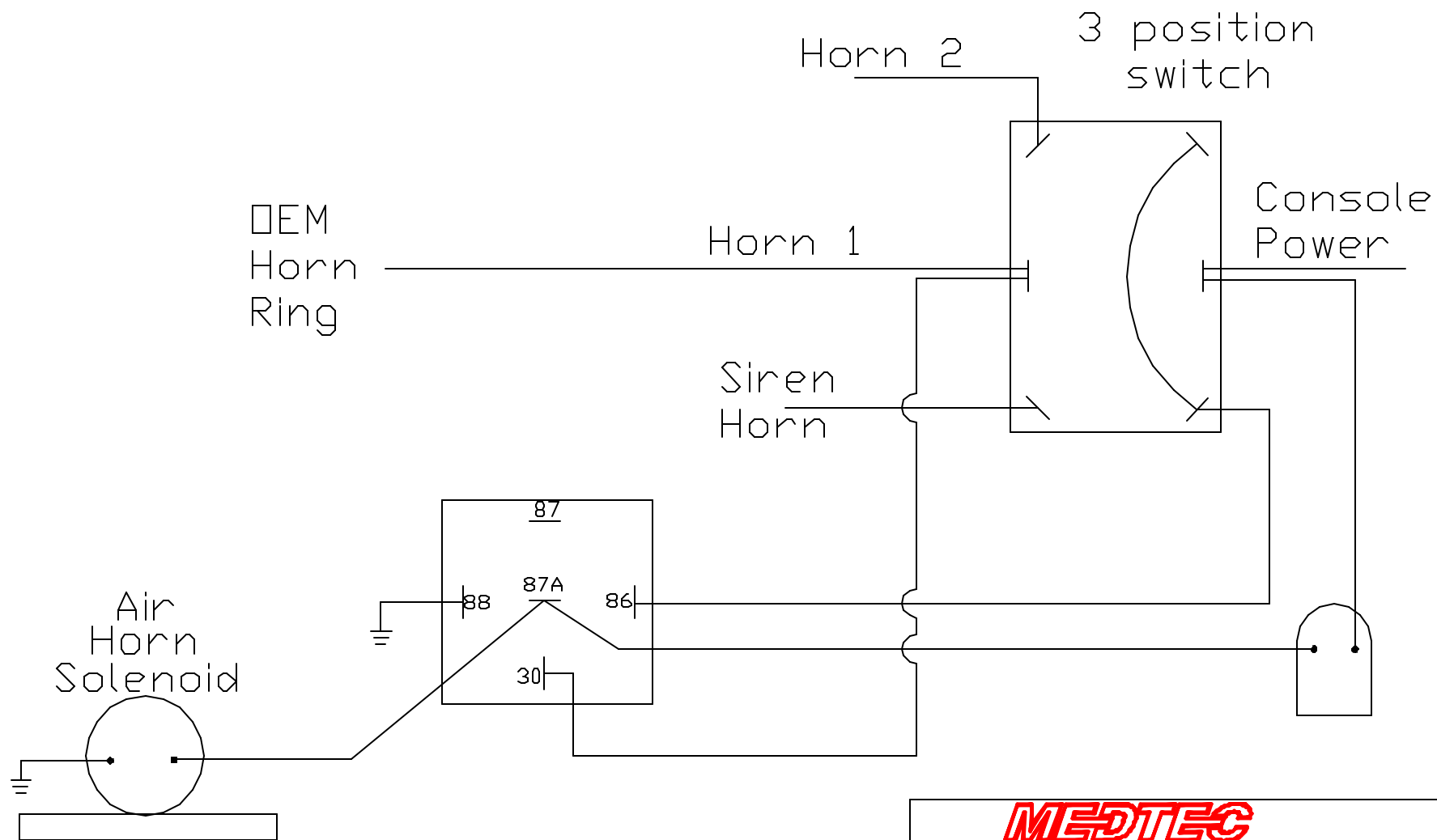
MEDTEC
A FERRIS COMPANY

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	DRAWING NUMBER: 17-12.DWG	



MEDTEC A PERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/20/99		REVISED:
PART NAME: Air Horn		
		DRAWING NUMBER: 18-1.DWG

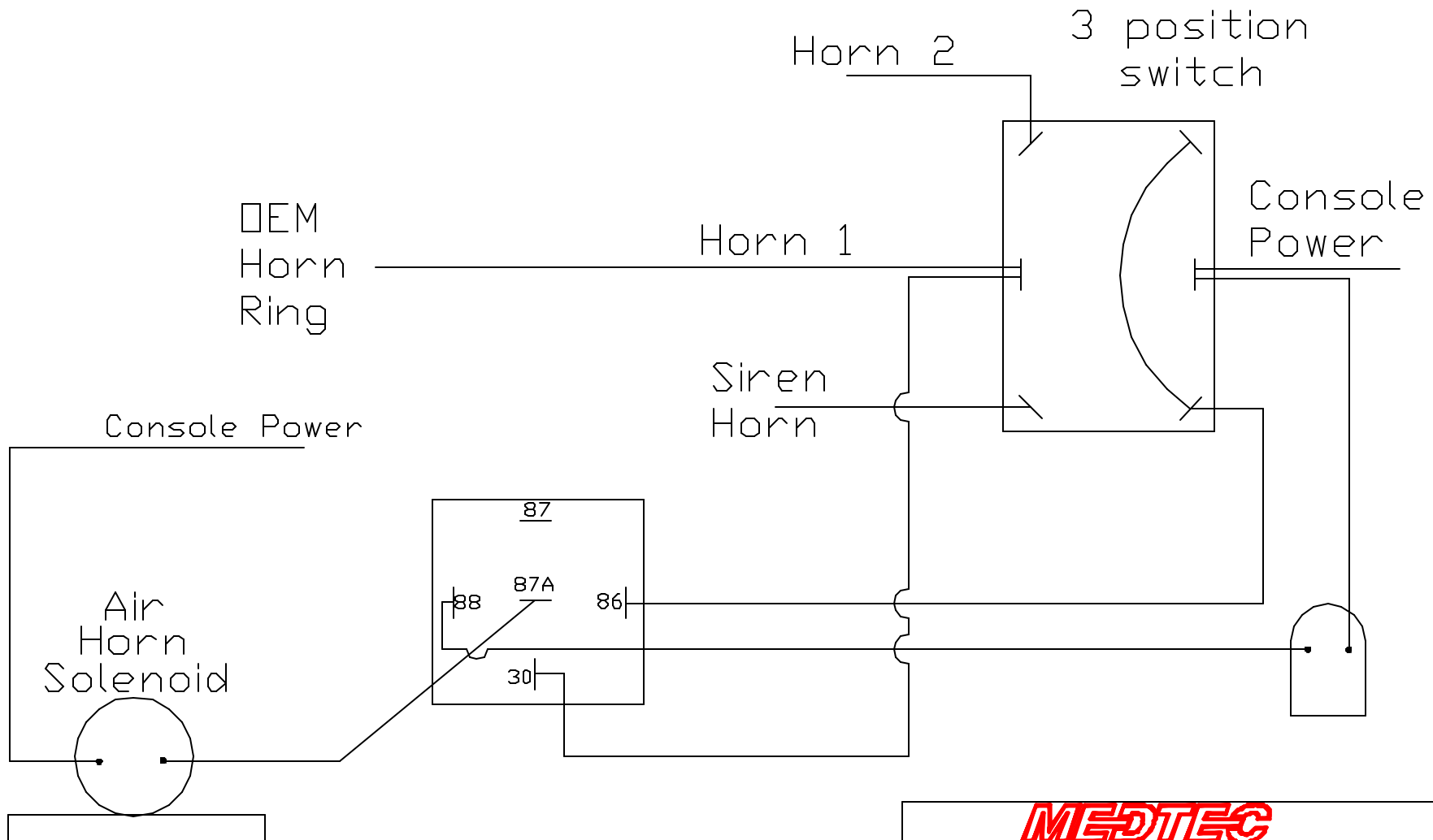
18-2



Ford, Chevrelot,
Dodge, & International

MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: R/WB
DATE: 8/20/99		REVISED:
PART NAME: Air Horn Hookup		
		DRAWING NUMBER: 18-2.DWG

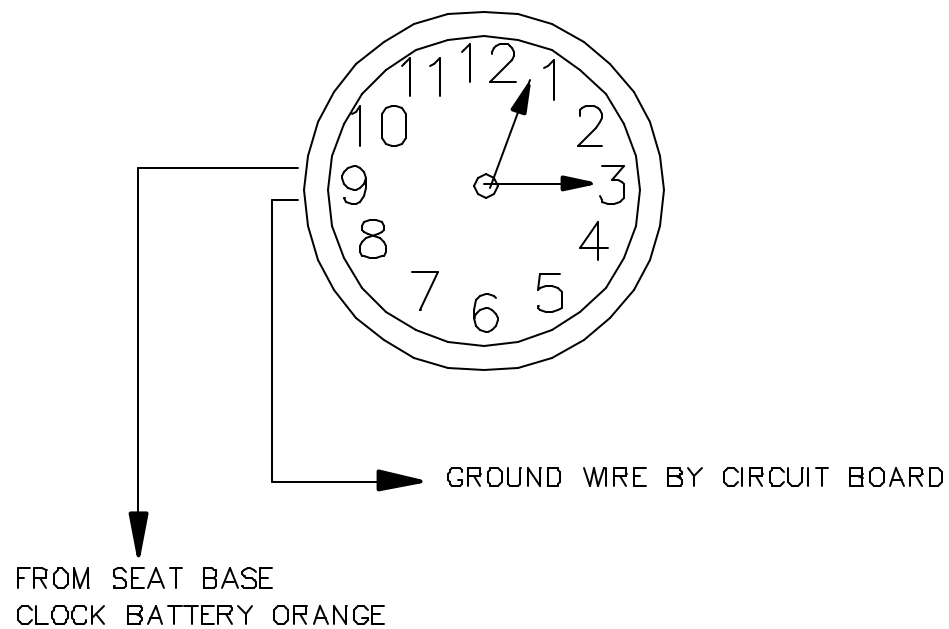


Freightliner

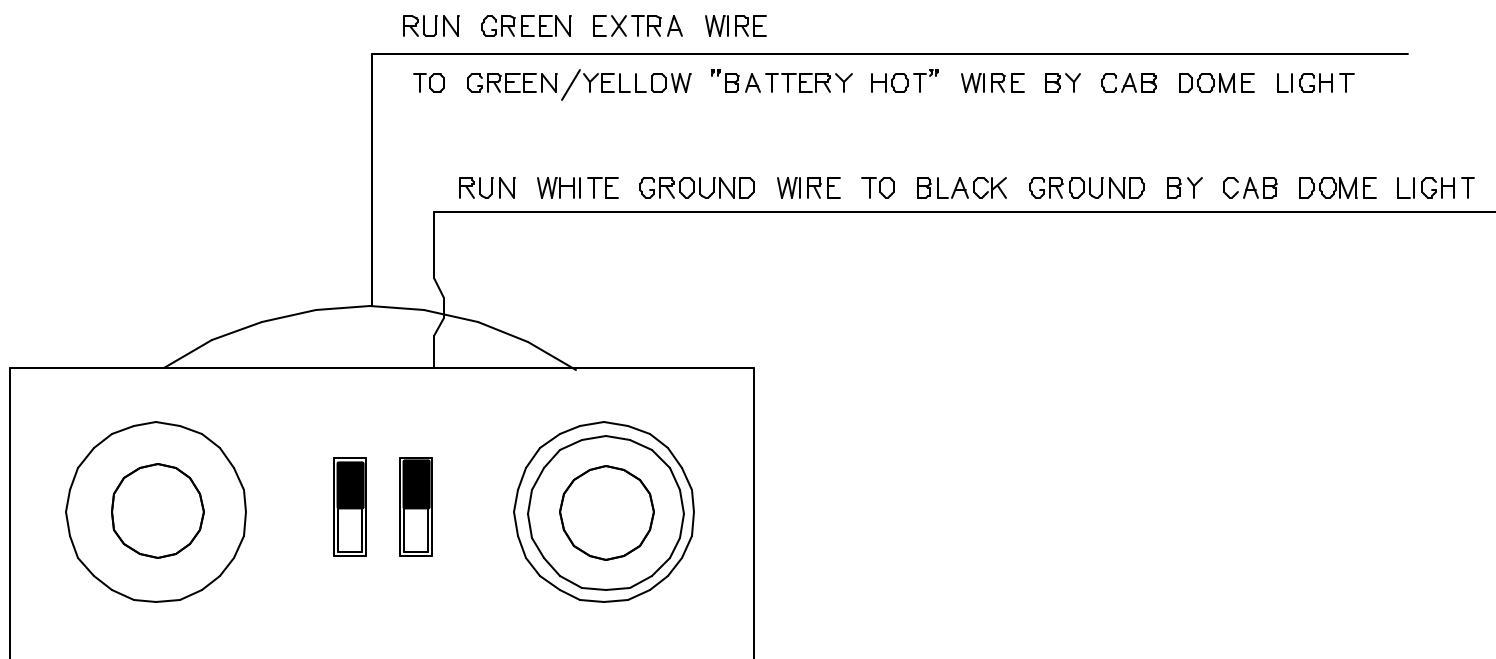
MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/20/99		REVISED:
PART NAME: Air Horn Hookup		
		DRAWING NUMBER: 18-3.DWG

VDO CLOCK LOCATED IN ACTION AREA



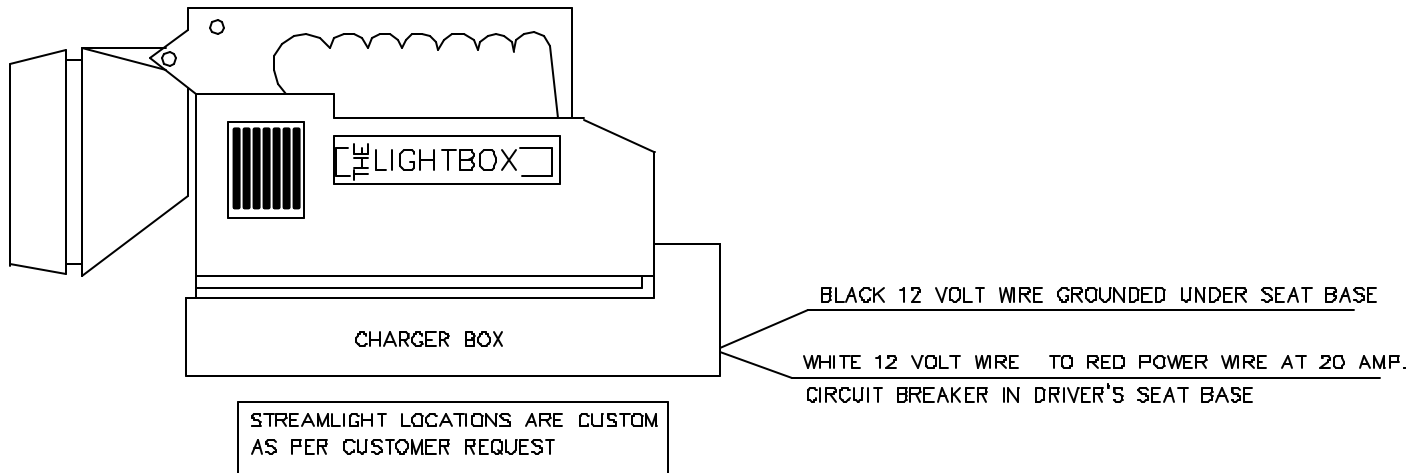
MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: VDO Clock		
		DRAWING NUMBER: 18-4.DWG



AIRCRAFT LIGHT LOCATED BETWEEN SUN VISORS IN CAB

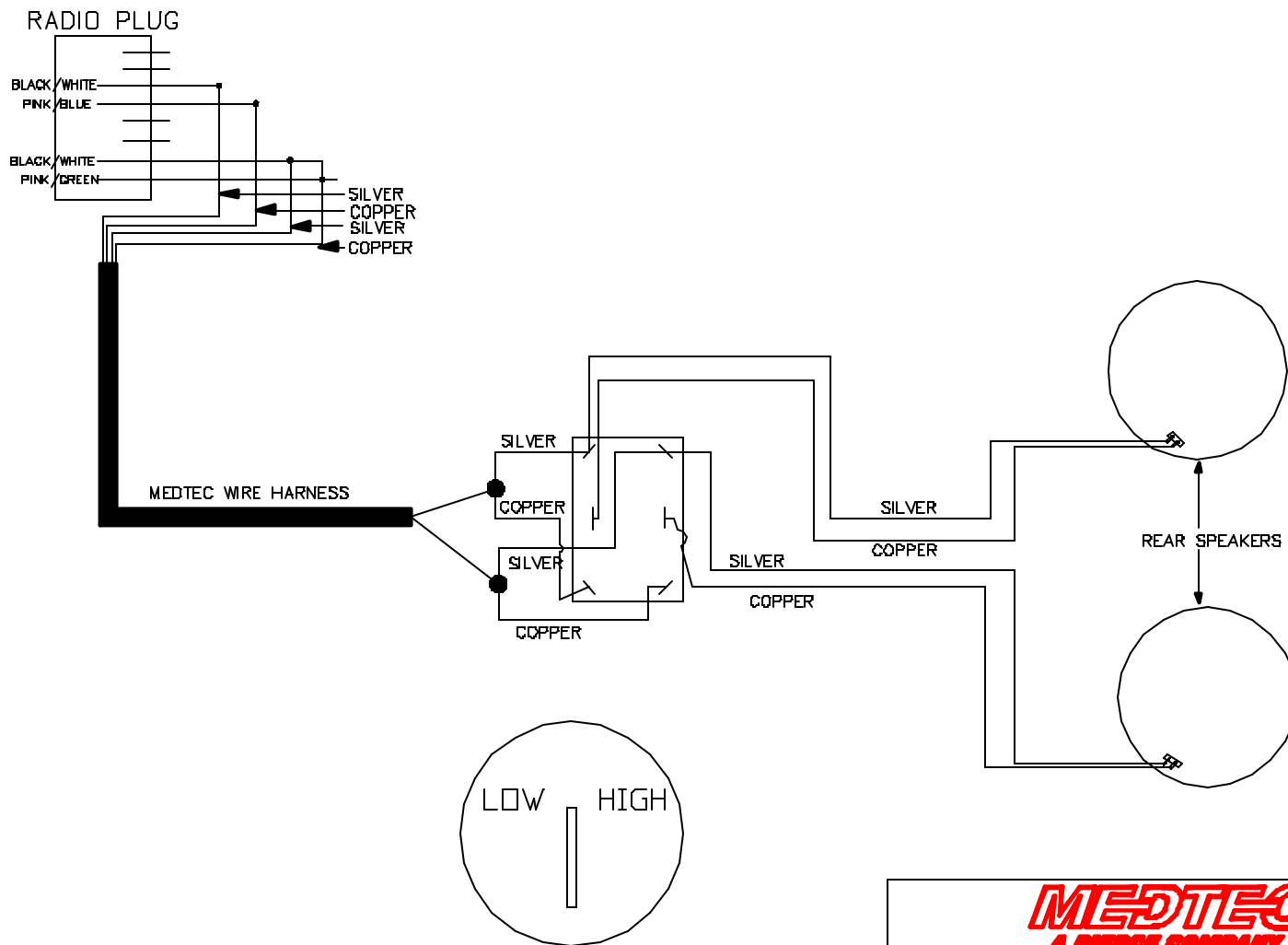
MEDTEC
A PERKINS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/20/99	Herman Mullet	REVISED:
PART NAME: Cab Aircraft Light		
		DRAWING NUMBER: 18-5.DWG



MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/20/99	Herman Mullet	REVISED:
PART NAME: Streamlight SL45 Flashlight		
		DRAWING NUMBER: 18-6.DWG

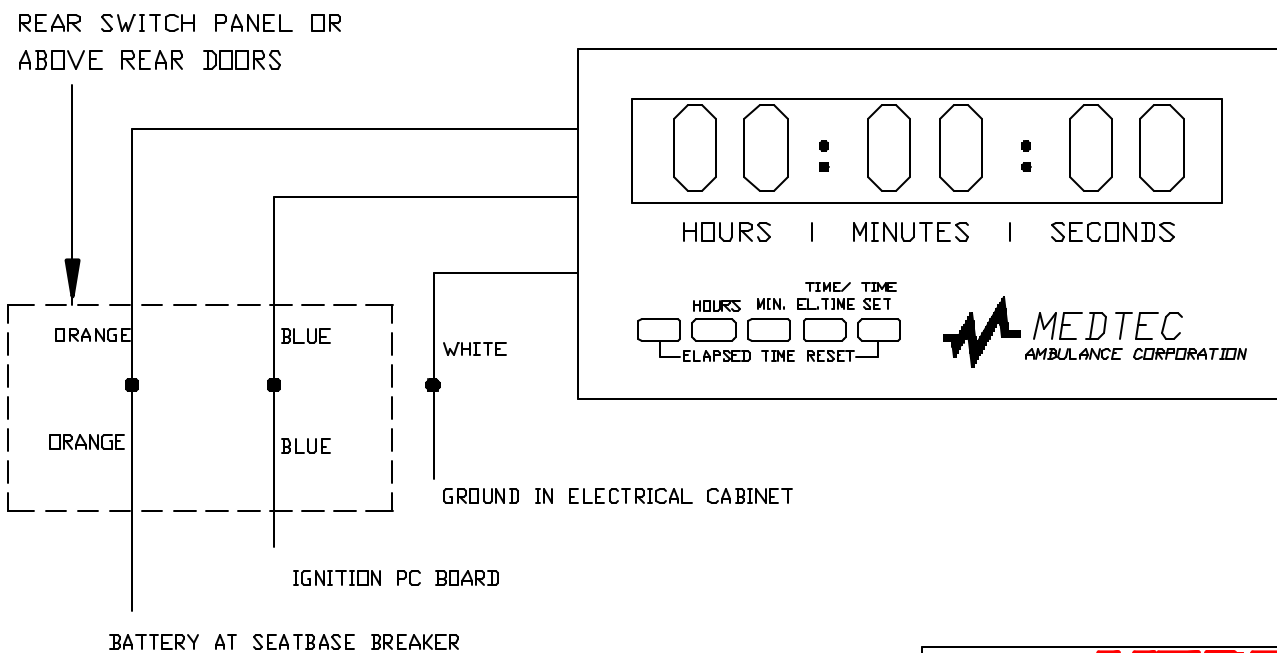
18-7



MEDTEC
A PIONEER COMPANY

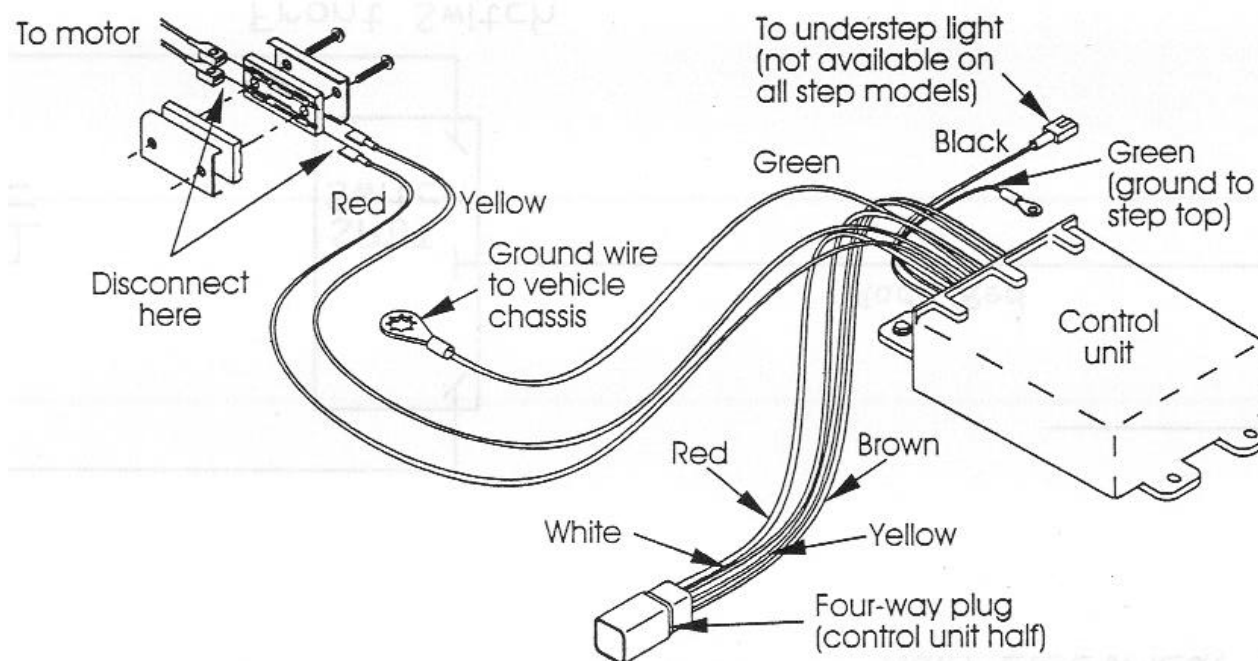
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Rear Speakers With Fader		
		DRAWING NUMBER: 18-7.DWG

MEDTEC DIGITAL CLOCK



MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/18/01		REVISED:
PART NAME: Medtec Digital Clock		
Elapsed Timer		DRAWING NUMBER: 18-8.DWG

Electrical Wiring for the Electric R.V. Step

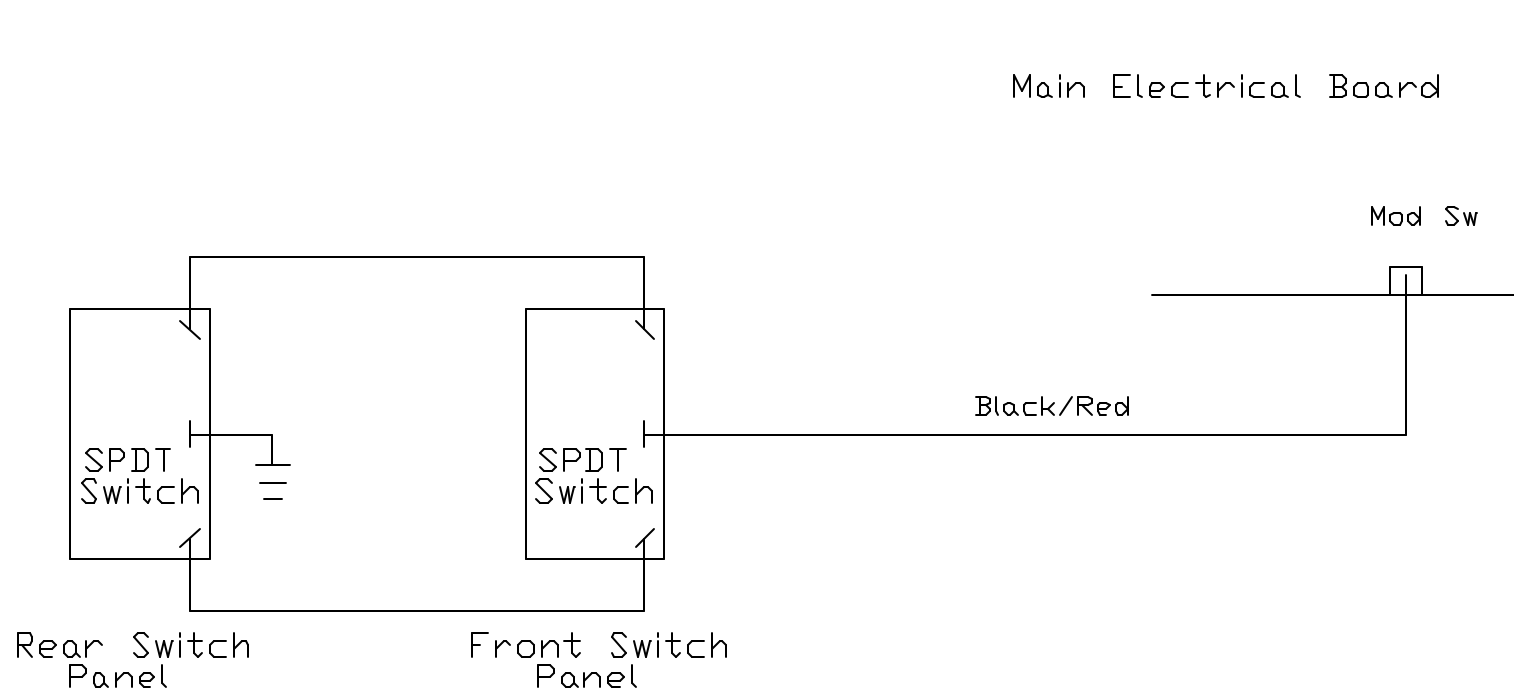


Green—Ground to Frame
 Red > Battery Power
 White > 10 Gage to PC Board
 Yellow—To Ignition
 Brown—Tie into Red Side
 Door Switch Wire

MEDTEC
 A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Herman Mullet	REVISED:
PART NAME: Electric RV Step		
		DRAWING NUMBER: 18-9.DWG

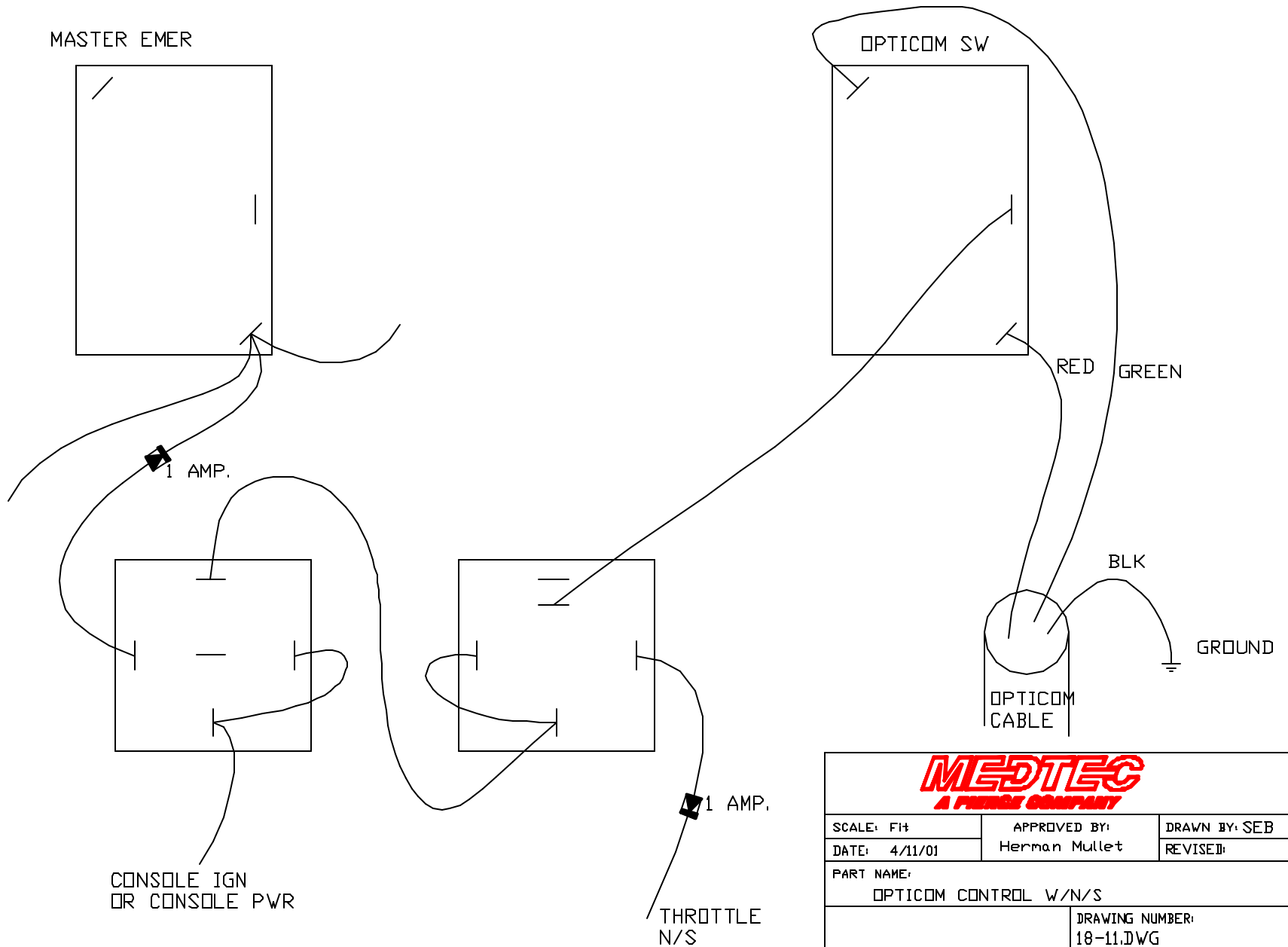
3-Way Mod Disconnect Switches (Front-to-Rear)

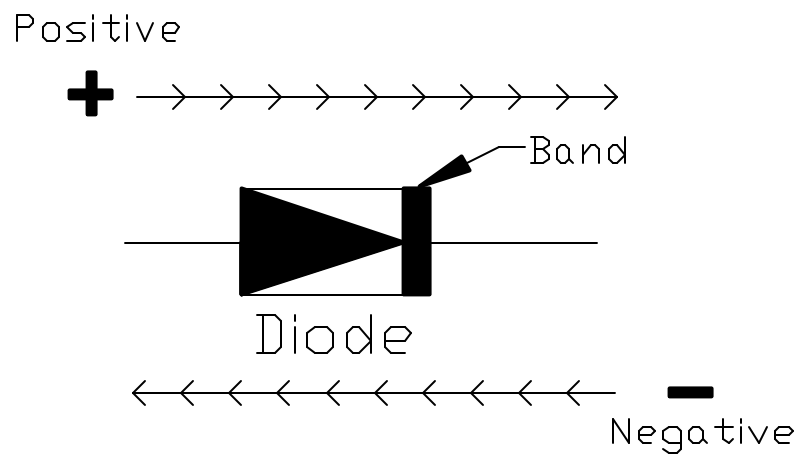


MEDTEC
A PERGE COMPANY

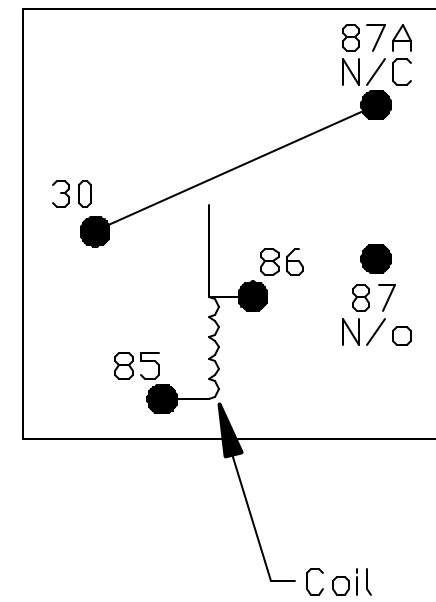
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Herman Mullet	REVISED:
PART NAME: Front & Rear Mod Disconnect Switch		
		DRAWING NUMBER: 18-10.DWG

18-11





Relay



MEDTEC A PERGE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/23/99	Rodney Burnham	REVISED:
PART NAME: Diode & 12 VDC Relay		
		DRAWING NUMBER: 19-1.DWG

Primary Switching

The following circuits
are energized:

Grill Lights
Intersection Lights
White Flash (front)
&
Secondary Loads

Secondary Switching

The following circuits
are de-energized:

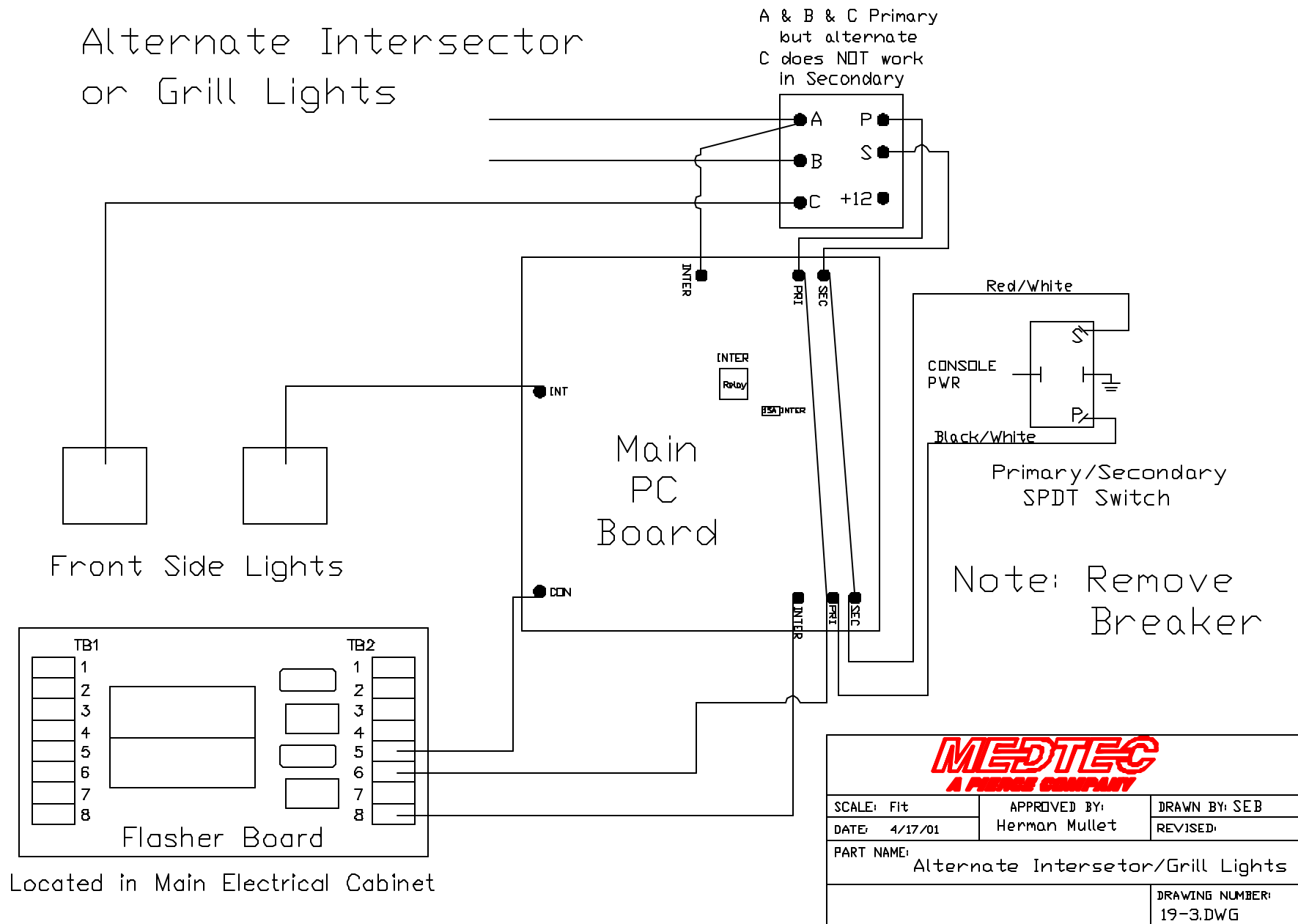
Optional Wheel Well Lights
Lights that stay "on"
All Box Lights
Yellow Rear Center
Optional Rear Lights

MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/23/99	Herman Mullet	REVISED:
PART NAME: Primary/Secondary Switching		
		DRAWING NUMBER: 19-2.DWG

19-3

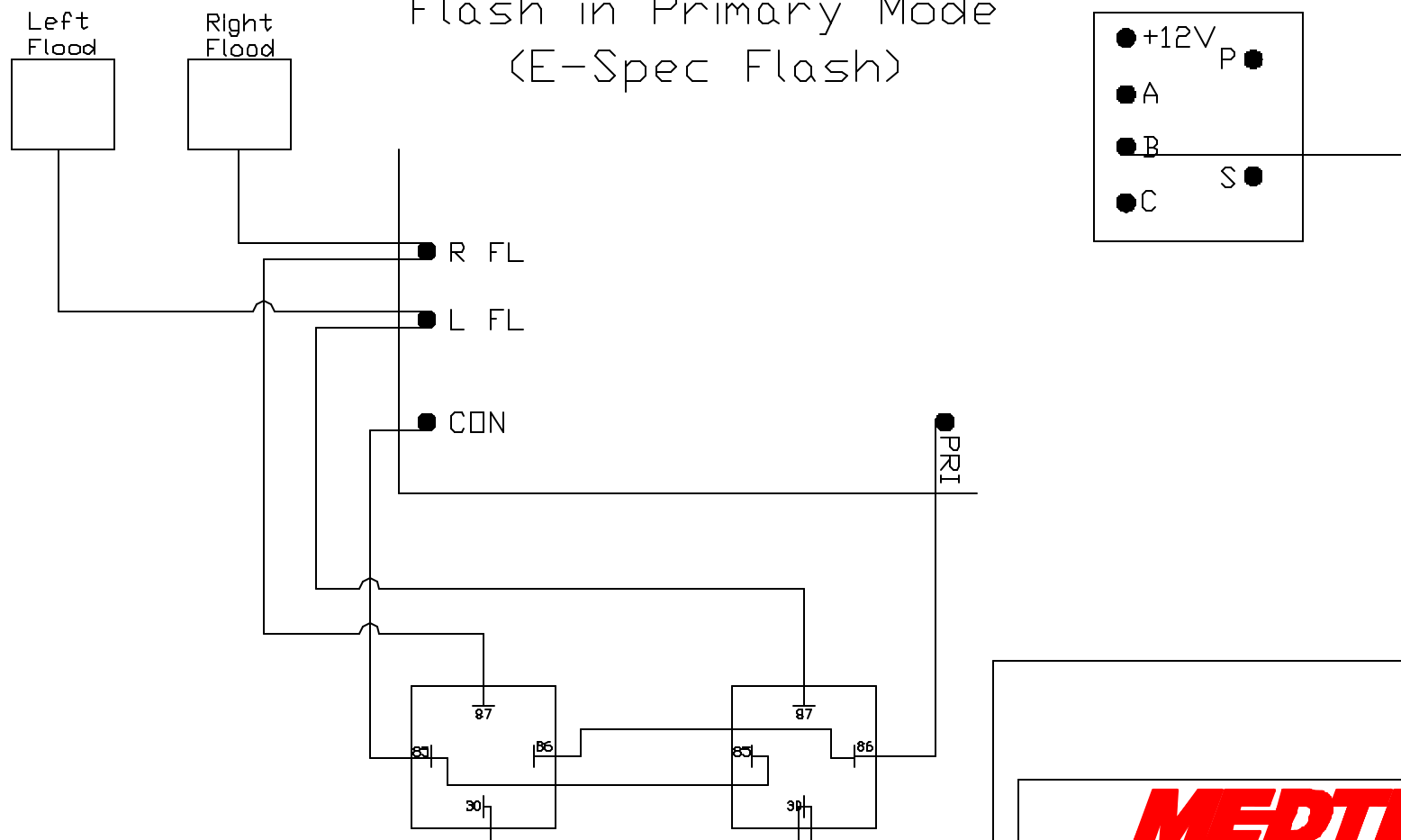
Alternate Intersector or Grill Lights



MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 4/17/01		REVISED:
PART NAME: Alternate Intersector/Grill Lights		
		DRAWING NUMBER: 19-3.DWG

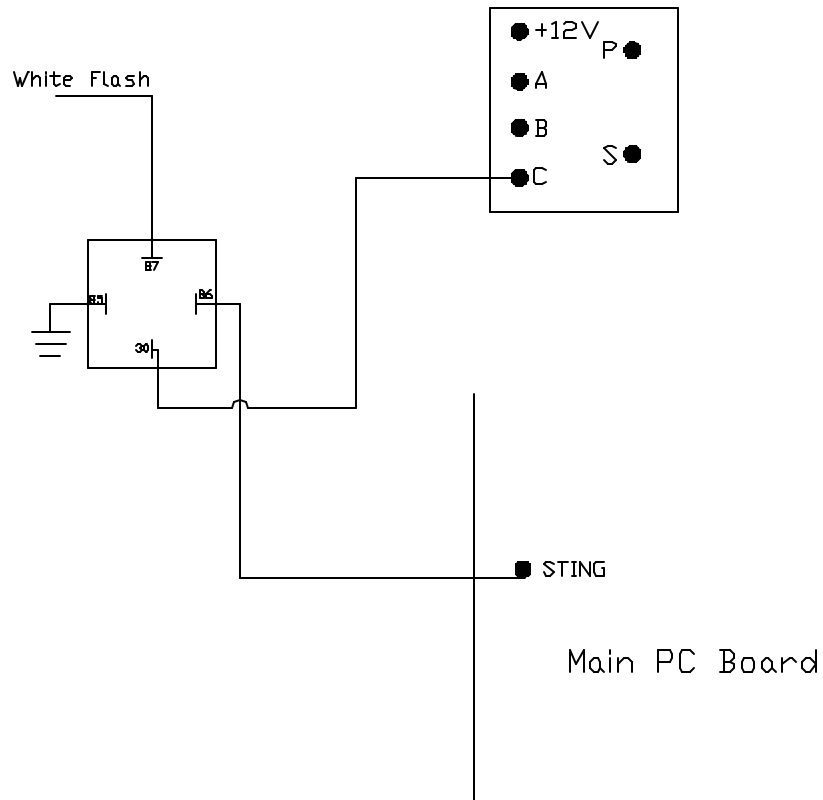
Right & Left Scene Lights Flash in Primary Mode (E-Spec Flash)

**MEDTEC**

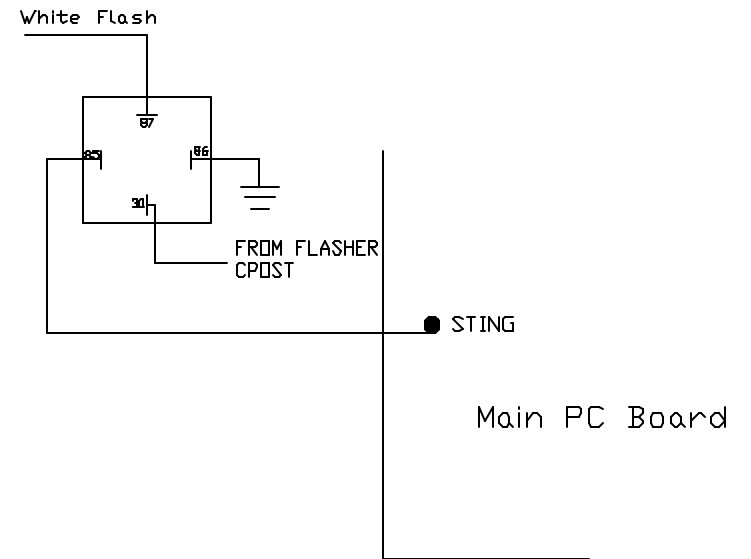
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 10/21/03		REVISED
PART NAME: Right & Left Scene Lights Flash in Primary Mode		
		DRAWING NUMBER: 19-4.DWG

19-5

Center Clear to Work
Off Front Beacon Switch



Center Clear

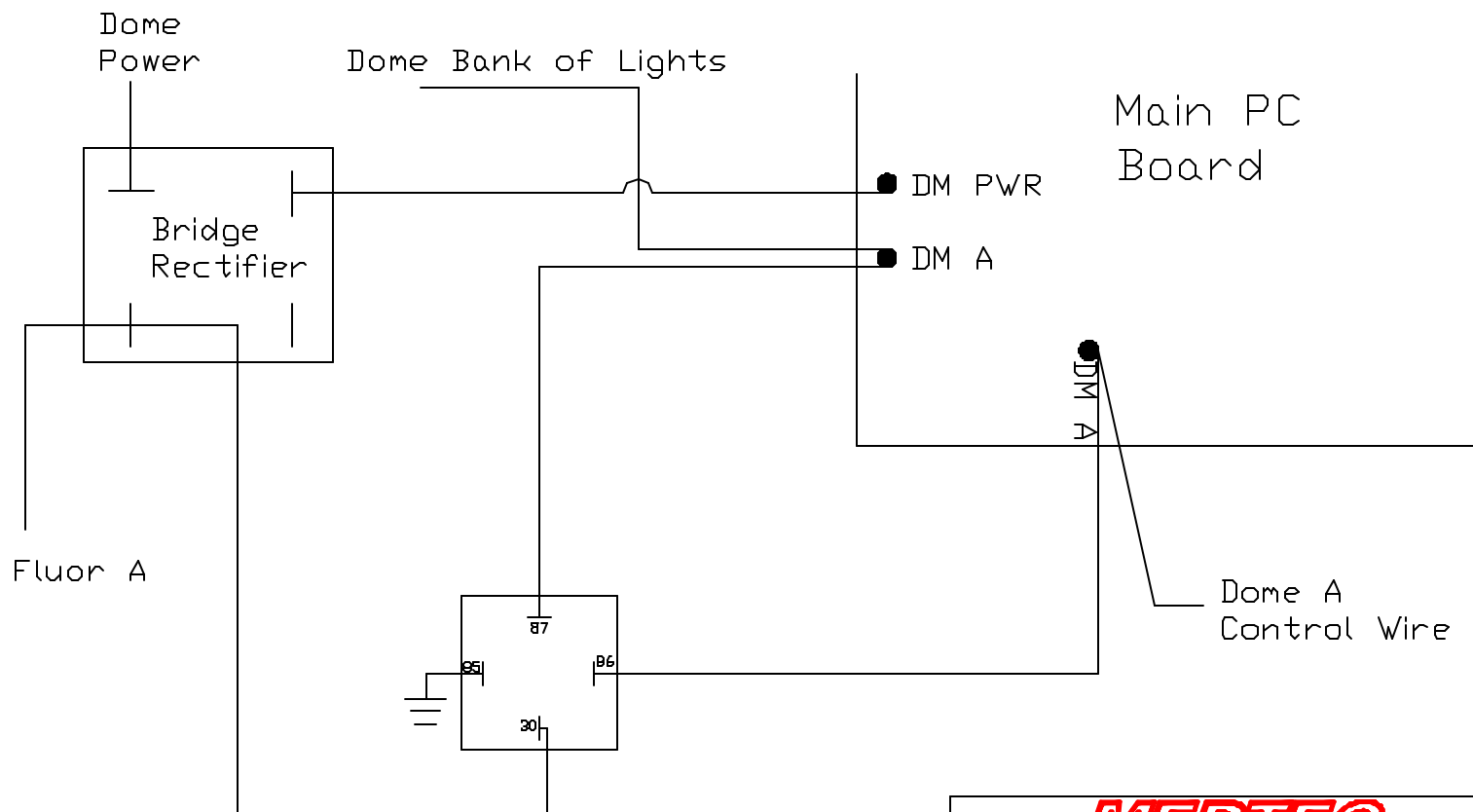


MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Center Clear Light Flashing		
		DRAWING NUMBER: 19-5.DWG

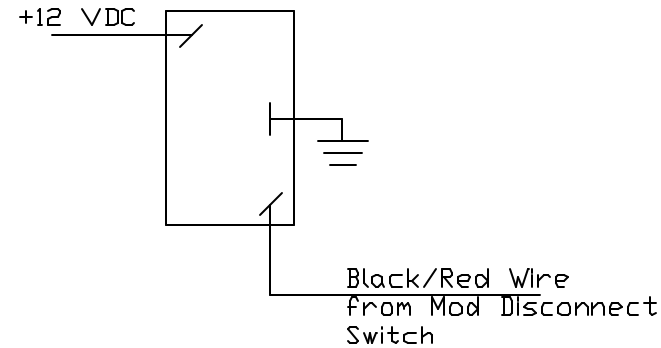
19-6

Dome A to work with Shoreline



MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/23/99	Herman Mullet	REVISED:
PART NAME:		
Dome A to work with Shoreline		
		DRAWING NUMBER:
		19-6.DWG

Mod Disconnect Switch



Emergency Switching

Note: Provides a ground signal to sequencer which controls the various relays that are included in the sequencer.

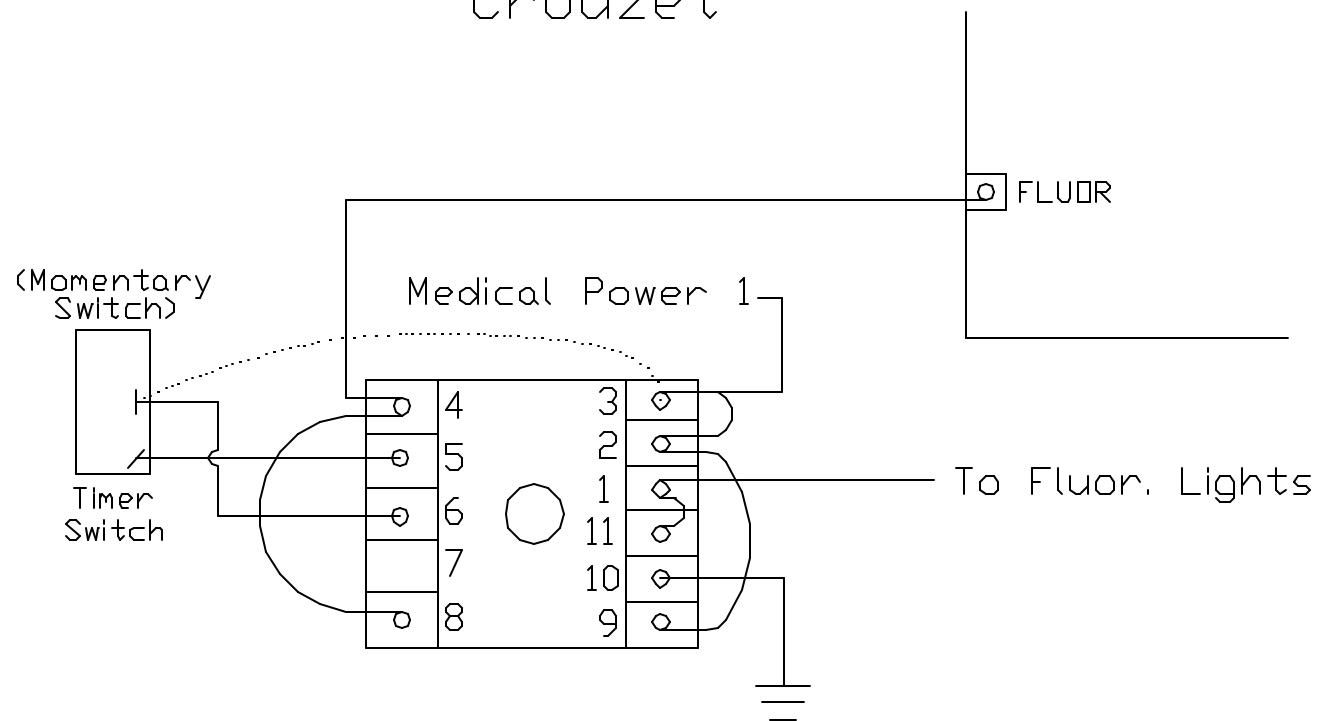
Note: The Mod Disconnect Relay provides ground to all interior relays

Note: If sequencer fails, the slide switch at the top left corner will provide a negative signal which will bypass the sequencer.

MEDTEC
A PERROT COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/23/99	Herman Mullet	REVISED:
PART NAME: Mod Disconnect Switch		
		DRAWING NUMBER: 19-7.DWG

Timer For Fluorescent (Mount Timer Upright) Crouzet

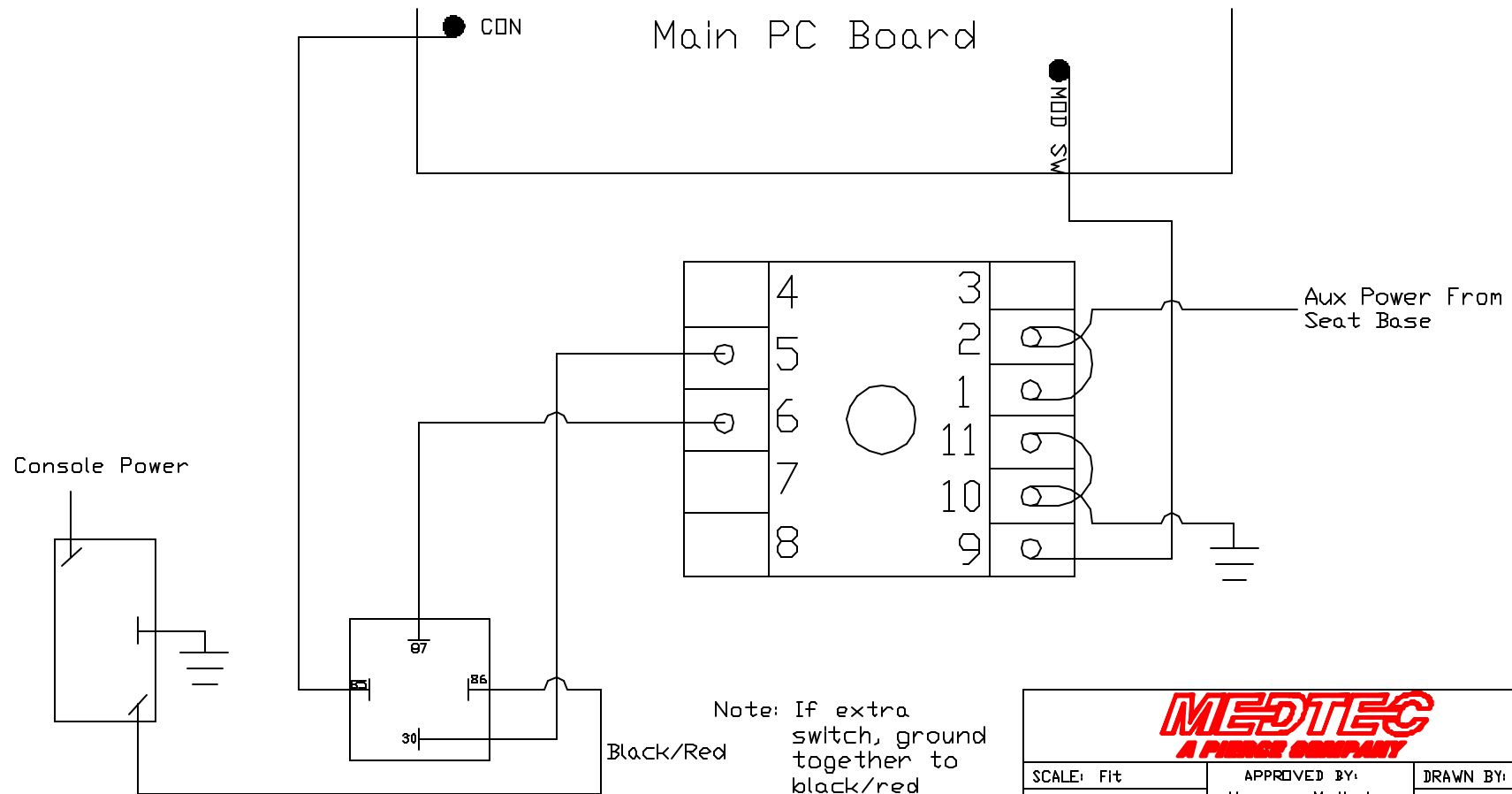


IF THE TIMER IS ORANGE USE SOLID
LINE FROM N6 IF THE TIME IS OFFWHITE
USE DOTED LINE FROM N3

MEDTEC A PERKINS COMPANY		
SCALE: Fit	APPROVED BY: Rodney Burnham	DRAWN BY: SEB
DATE: 4/17/01		REVISED
PART NAME: Fluorescent Lights Timer		
		DRAWING NUMBER: 19-8.DWG

19-9

Timer For Mod Disconnect (Battery Hot)

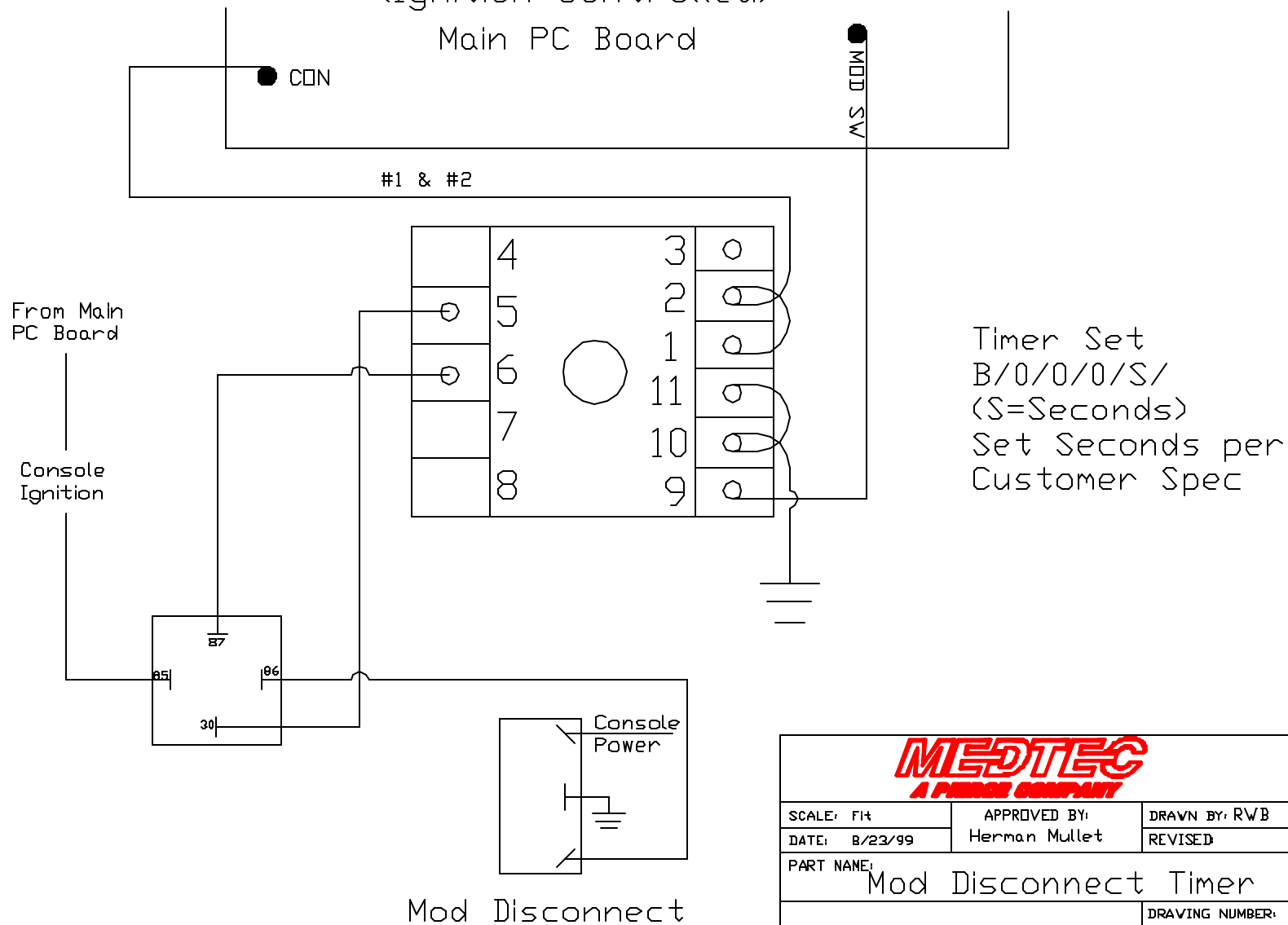


MEDTEC
A PIERCE COMPANY

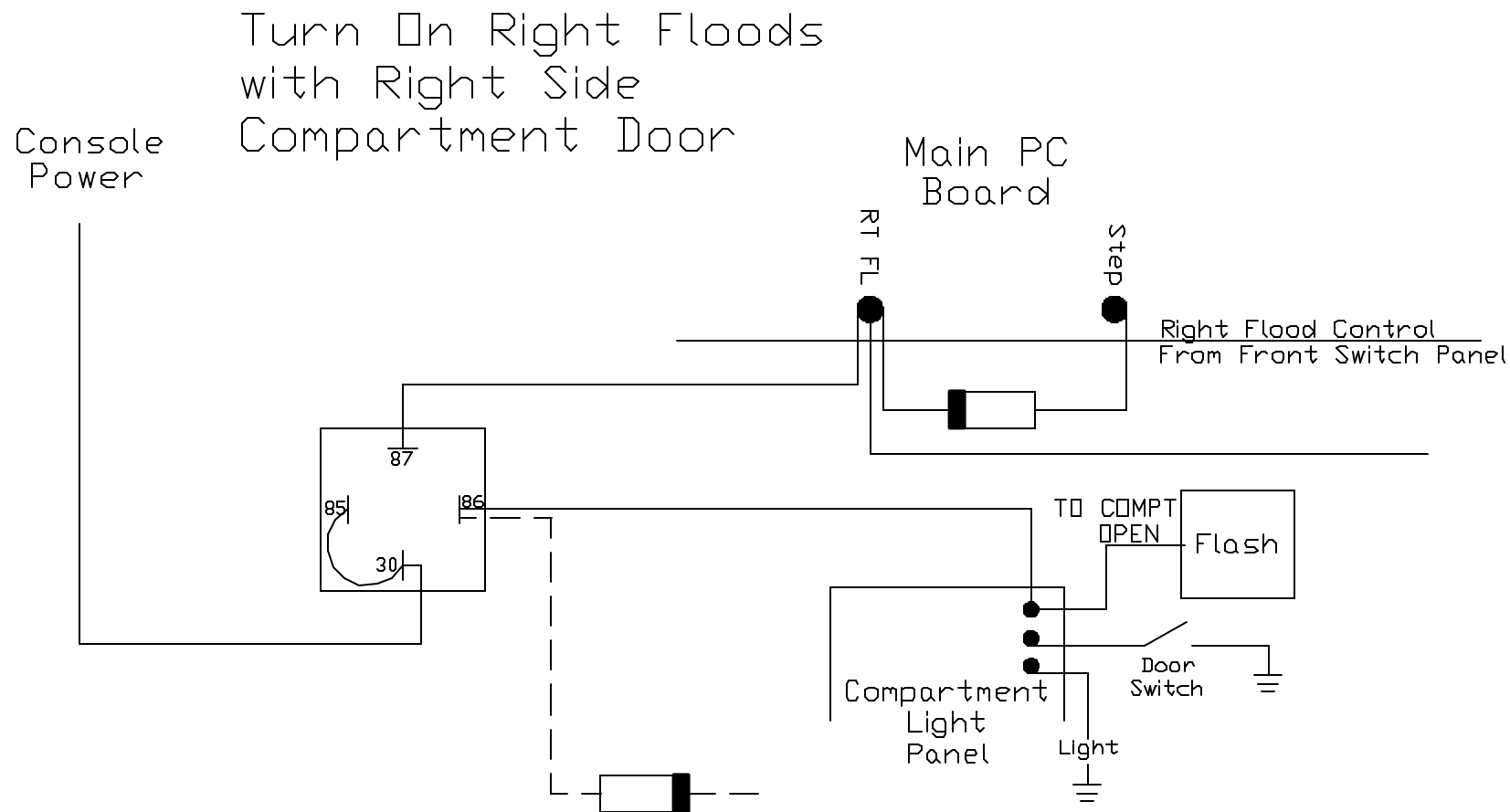
SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/23/99	Herman Mullet	REVISED:
PART NAME: Timer for Mod Disconnect		
		DRAWING NUMBER: 19-9.DWG

19-10

Timer For Mod Disconnect (Ignition Controlled) Main PC Board



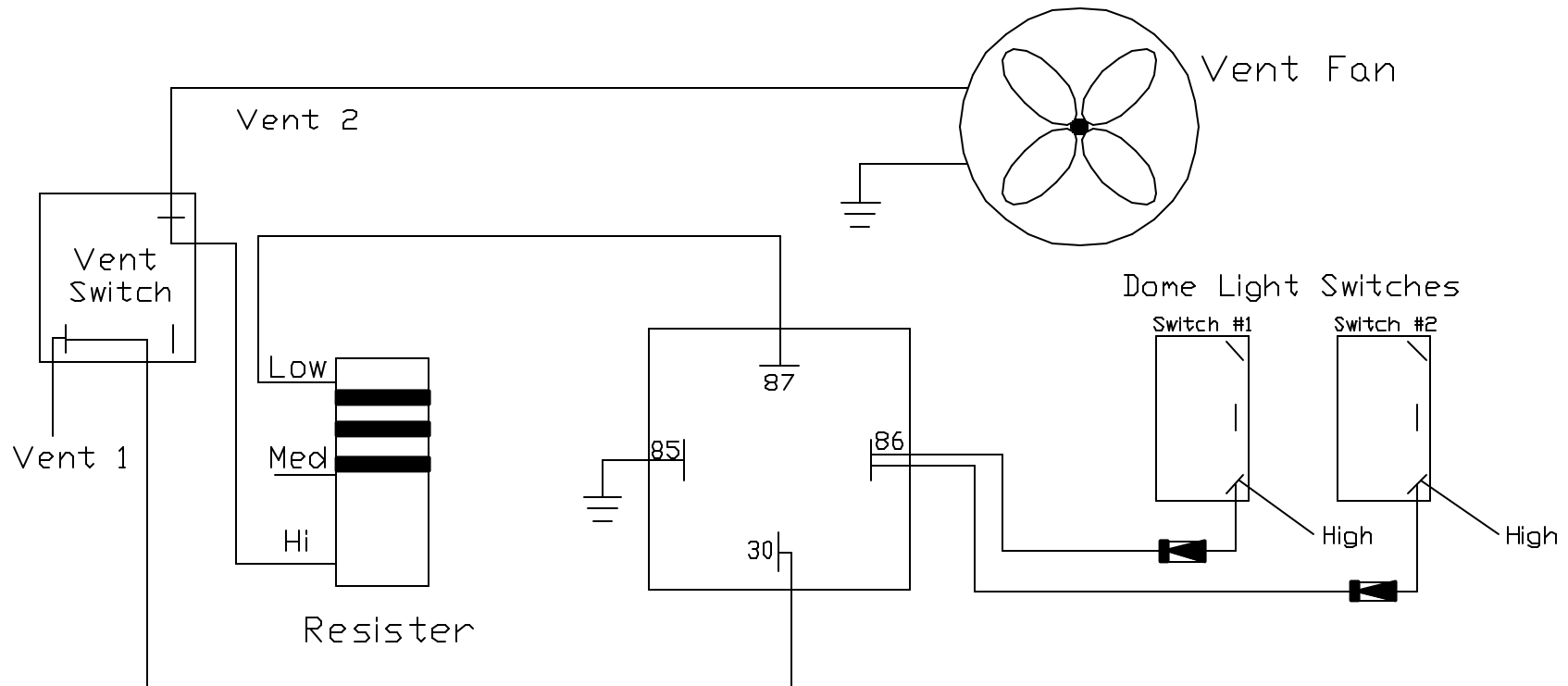
MEDTEC A PERCEC COMPANY		
SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: R/WB
DATE: 8/23/99		REVISED
PART NAME: Mod Disconnect Timer		
		DRAWING NUMBER: 19-10.DWG



Note: If you add
more circuits
off of switch,
you must add
a diode.

MEDTEC A PIERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Right Flood with Right Comp. Door		
		DRAWING NUMBER: 19-11.DWG

Vent Fan Comes on at Low Speed
With Dome Lights are on High

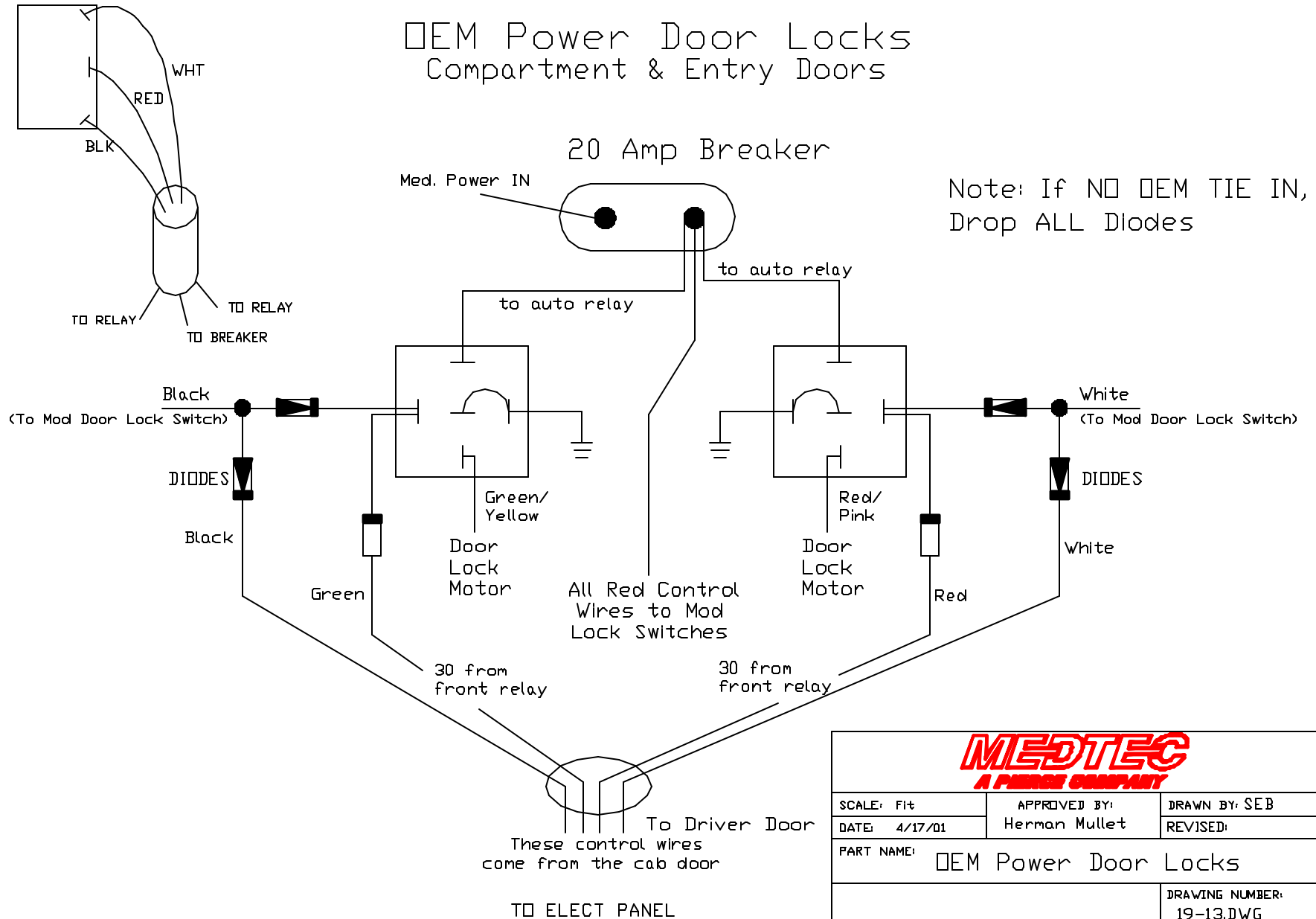


MEDTEC
A PRINCE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: RWB
DATE: 8/23/99		REVISED:
PART NAME: Vent Fan Low with Dome Lights on High		
		DRAWING NUMBER: 19-12.DWG

19-12

OEM Power Door Locks Compartment & Entry Doors

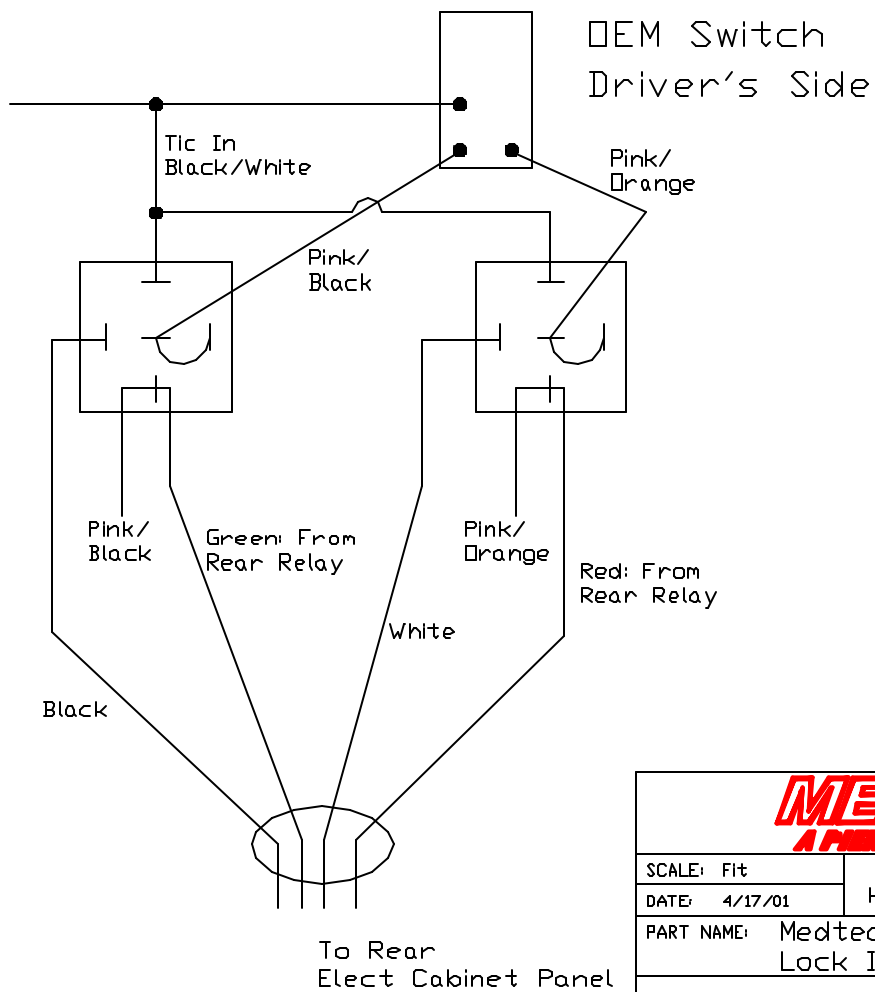


MEDTEC
A PERSE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: OEM Power Door Locks		
		DRAWING NUMBER: 19-13.DWG

OEM Power Door Locks Ford's & Medtec's interface

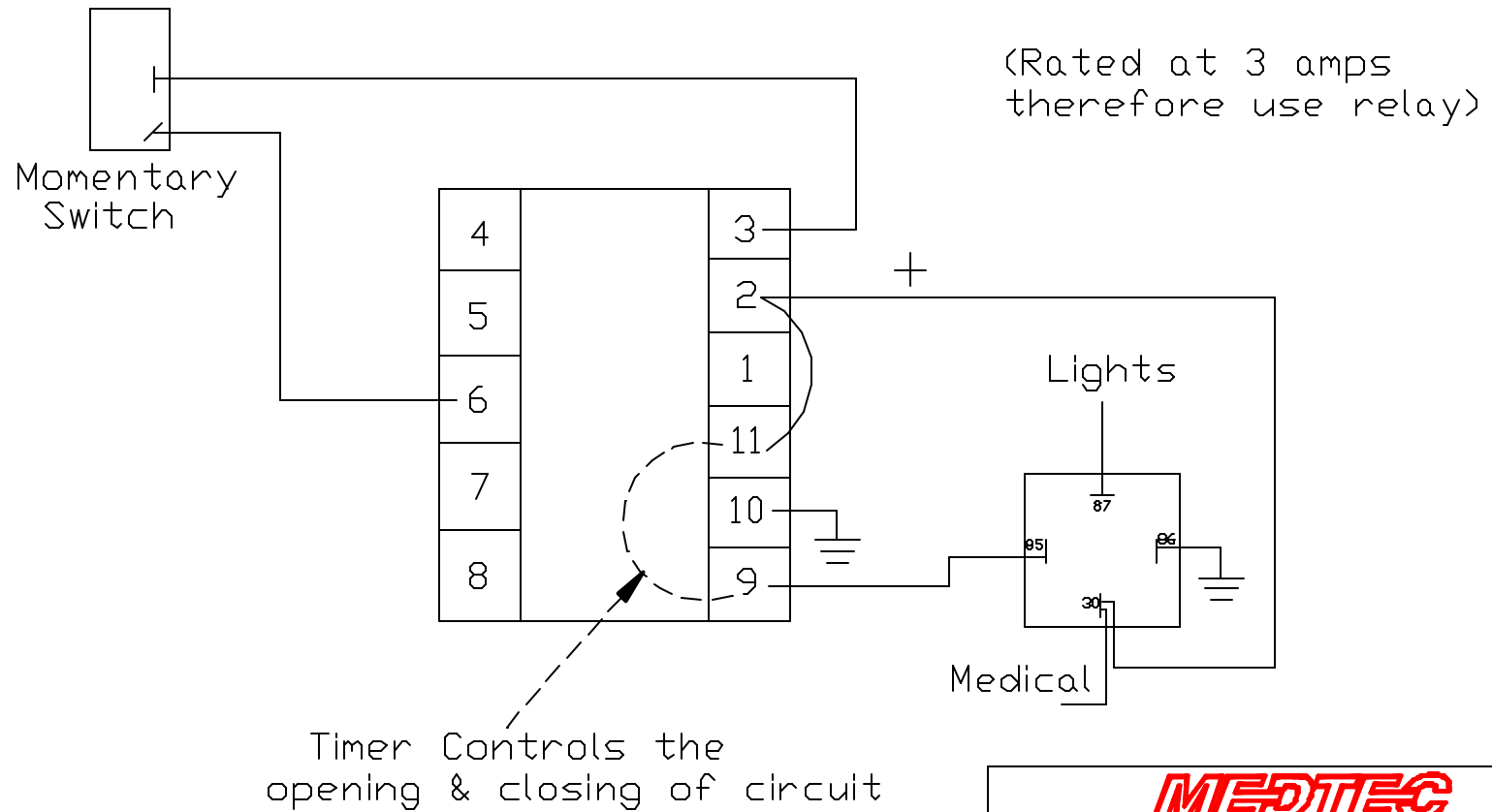
In Cab Door



MEDTEC
A PIERCE COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/17/01	Herman Mullet	REVISED:
PART NAME: Medtec/Ford Power Door Lock Interface		
		DRAWING NUMBER: 19-14.DWG

Micromatic Timer

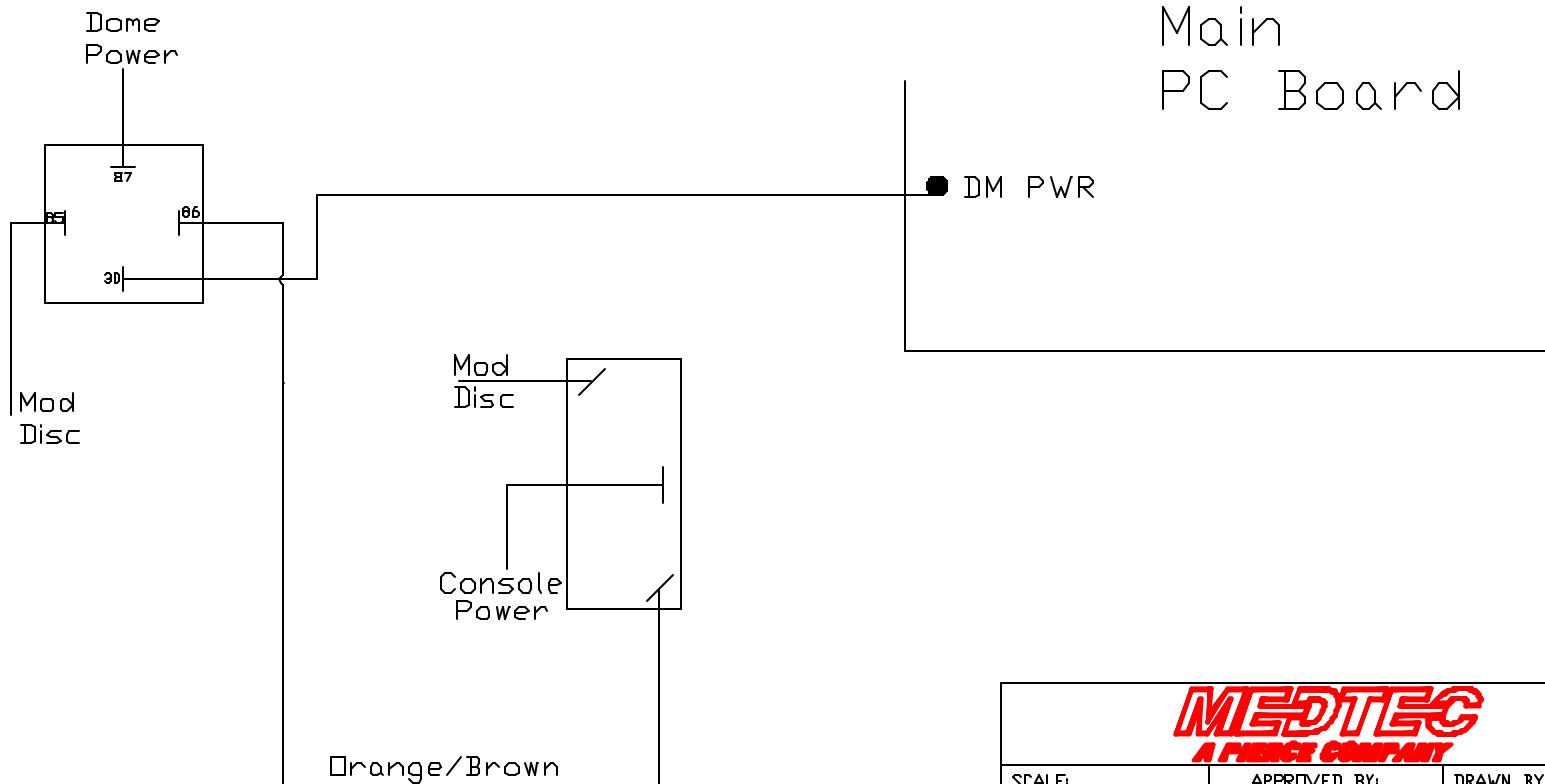


MEDTEC
A FURNESS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: RWB
DATE: 8/23/99	Herman Mullet	REVISED
PART NAME: Micromatic Timer		
		DRAWING NUMBER: 19-15.DWG

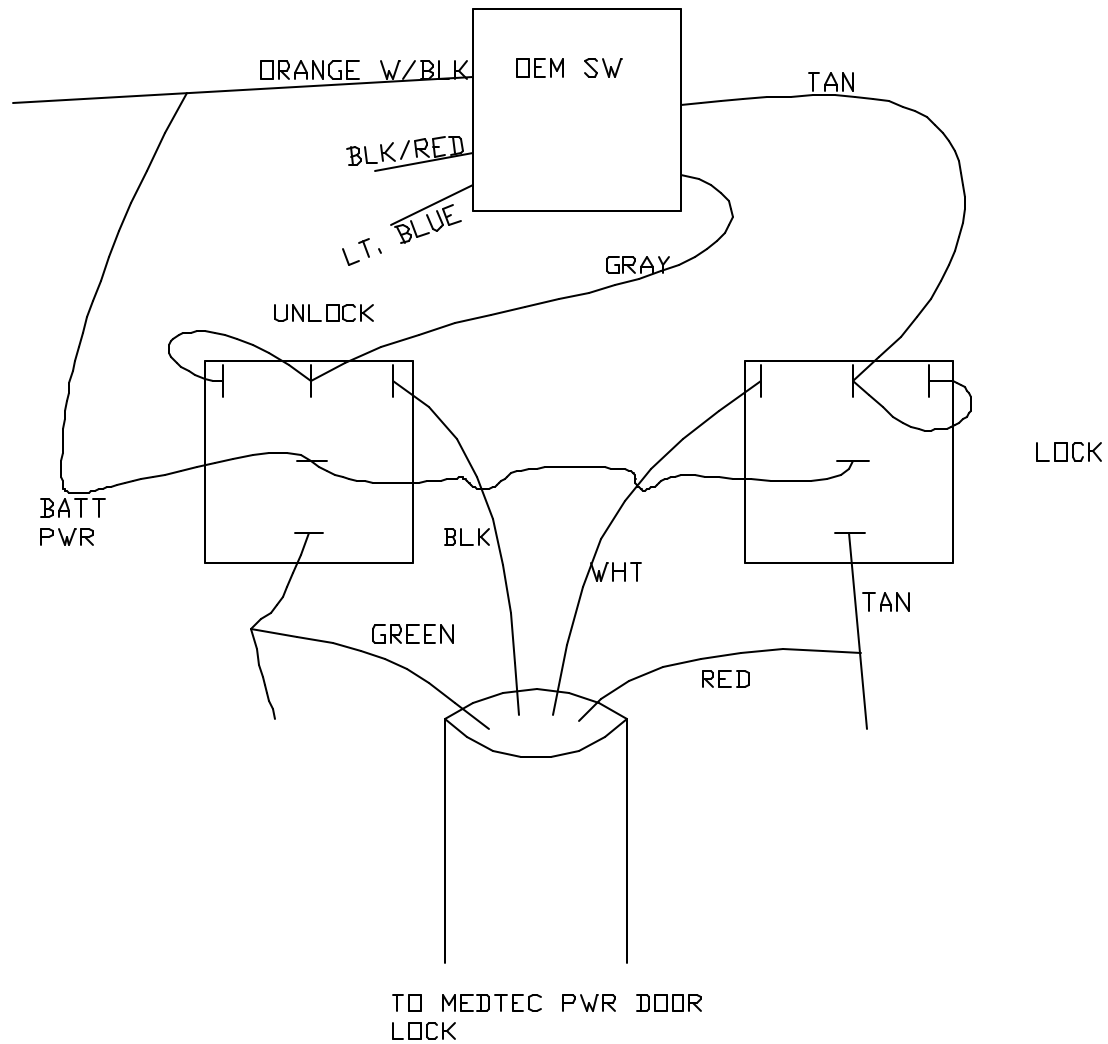
19-16

Master Dome Switch in Front Console



MEDTEC A PIERCE COMPANY		
SCALE:	APPROVED BY:	DRAWN BY: RWB
DATE: 9/9/99	Rodney Burnham	REVISED:
PART NAME: Master Dome Switch		
		DRAWING NUMBER: 19-16.DWG

19-17



MEDTEC
A FERRIS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/10/01	Herman Mullet	REVISED:
PART NAME:		
CHEVY OEM DOOR LOCK		
DRAWING NUMBER:		
19-17.DWG		

19-18

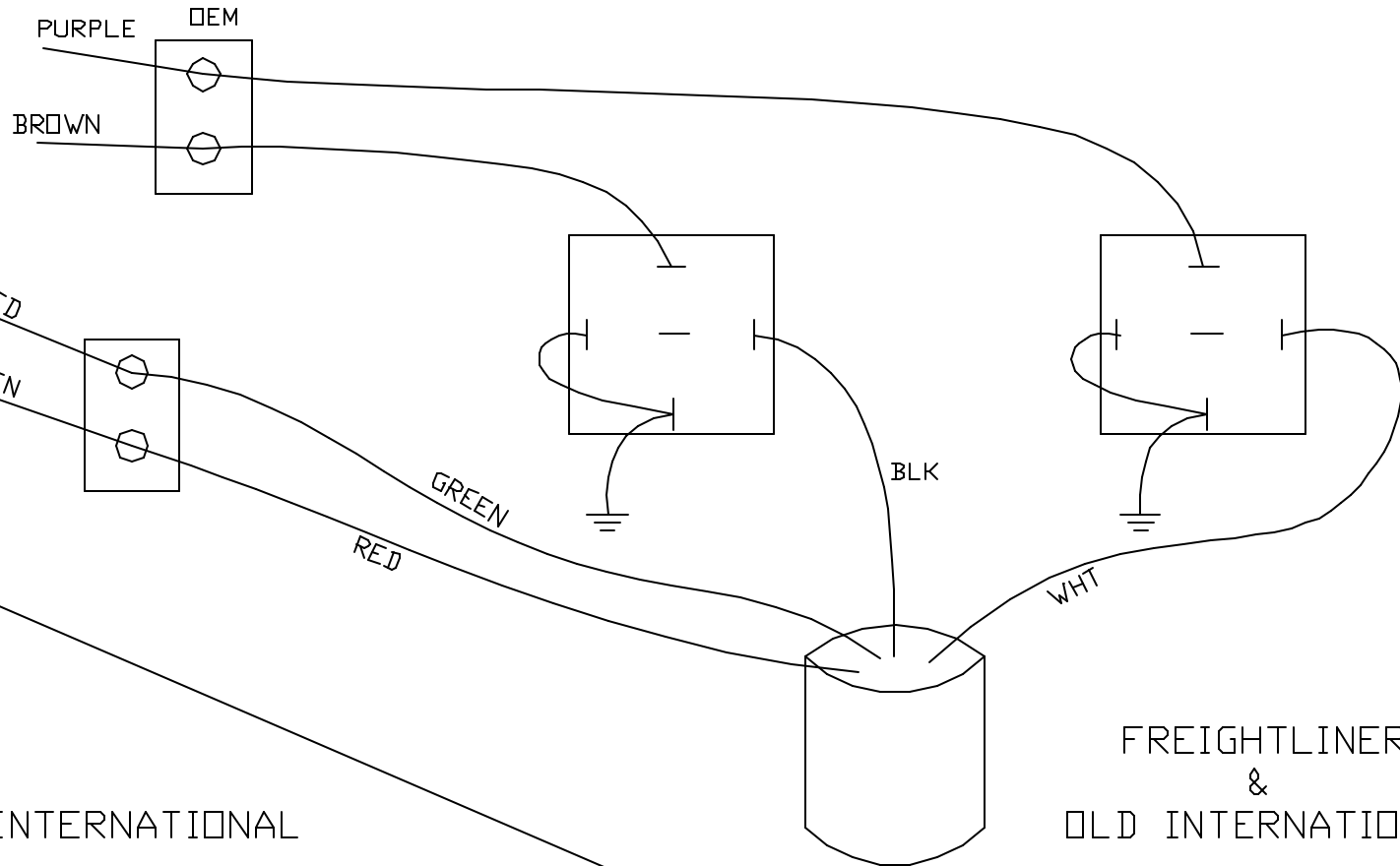
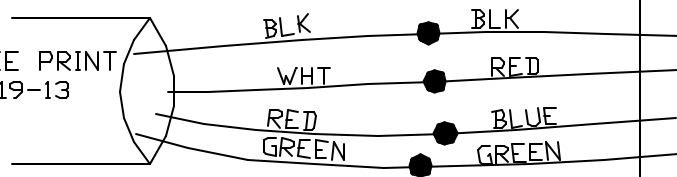
NEW INTERNATIONAL

FREIGHTLINER
&
OLD INTERNATIONAL

MEDTEC PRW
DOOR LOCK

NEW SOLID STATE

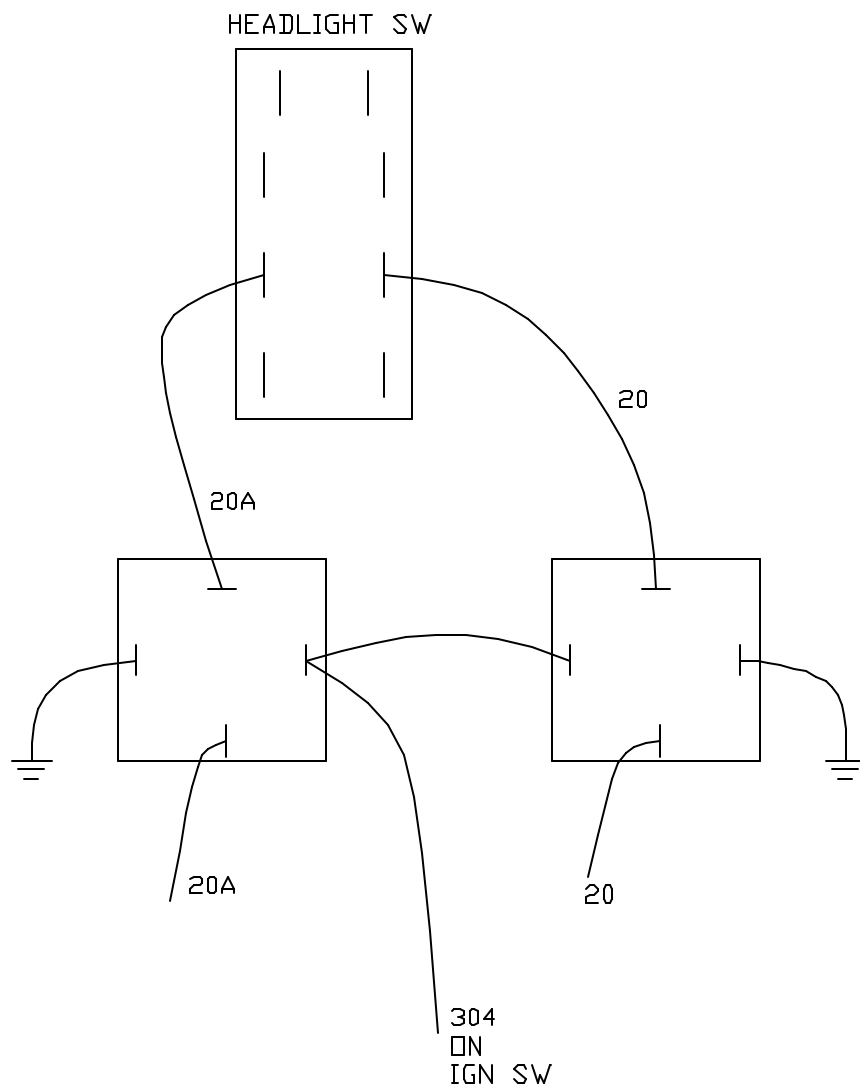
SEE PRINT
19-13



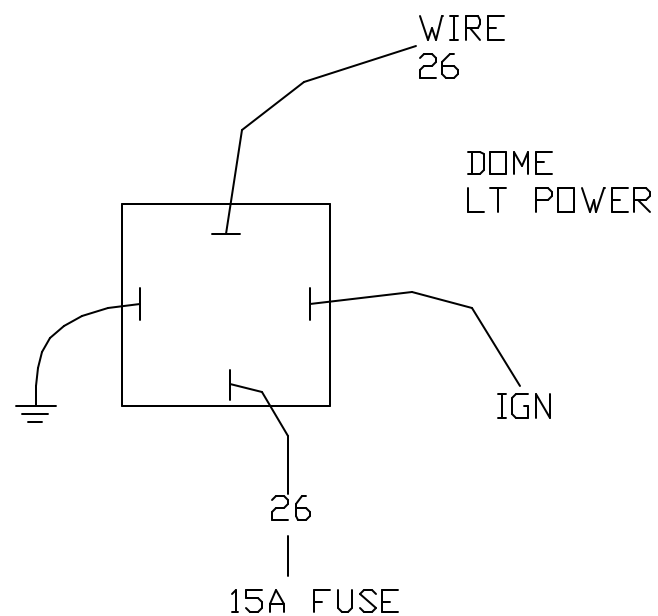
MEDTEC
A FORD COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/11/01	Herman Mullet	REVISED:
PART NAME:		
MEDIUM DUTY OEM DOOR LOCK		
DRAWING NUMBER:		19-18.DWG

19-19



IN FUSE PANEL

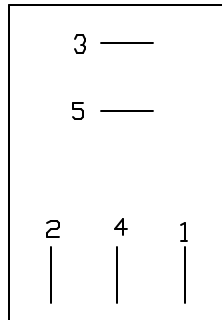


FREIGHTLINER HEADLIGHT, MARKER LIGHT
AND DOME LIGHT TO WORK ONLY WHEN IGN IS ON.

MEDTEC
A FERRIS COMPANY

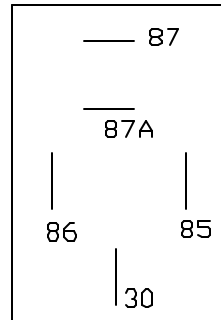
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 4/11/01	Herman Mullet	REVISED:
PART NAME:		
(FREIGHTLINER) LIGHT ON ONLY W/IGN		
DRAWING NUMBER:		
19-19.dwg		

10/20 AMP



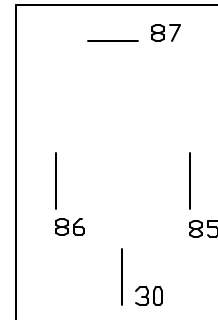
NC 3-4
NO 3-5
1 2 5
3 4

20/30 AMP



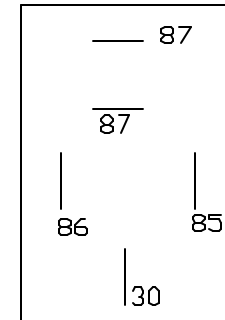
NC 30-87A
NO 30-87
85 86 87
30 87A

40 AMP



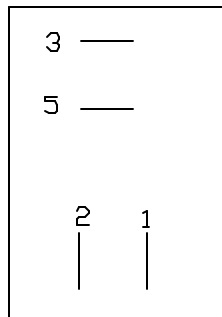
NO 30-87
85 86 87
30

40 AMP



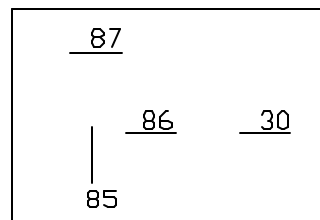
NO 30-87
85 86 87
30 87

20 AMP



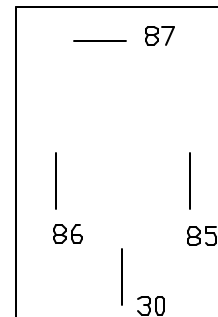
NO 3-5
1 2 5
3

75 AMP



NO 30-87
85 86 87
30

70 AMP

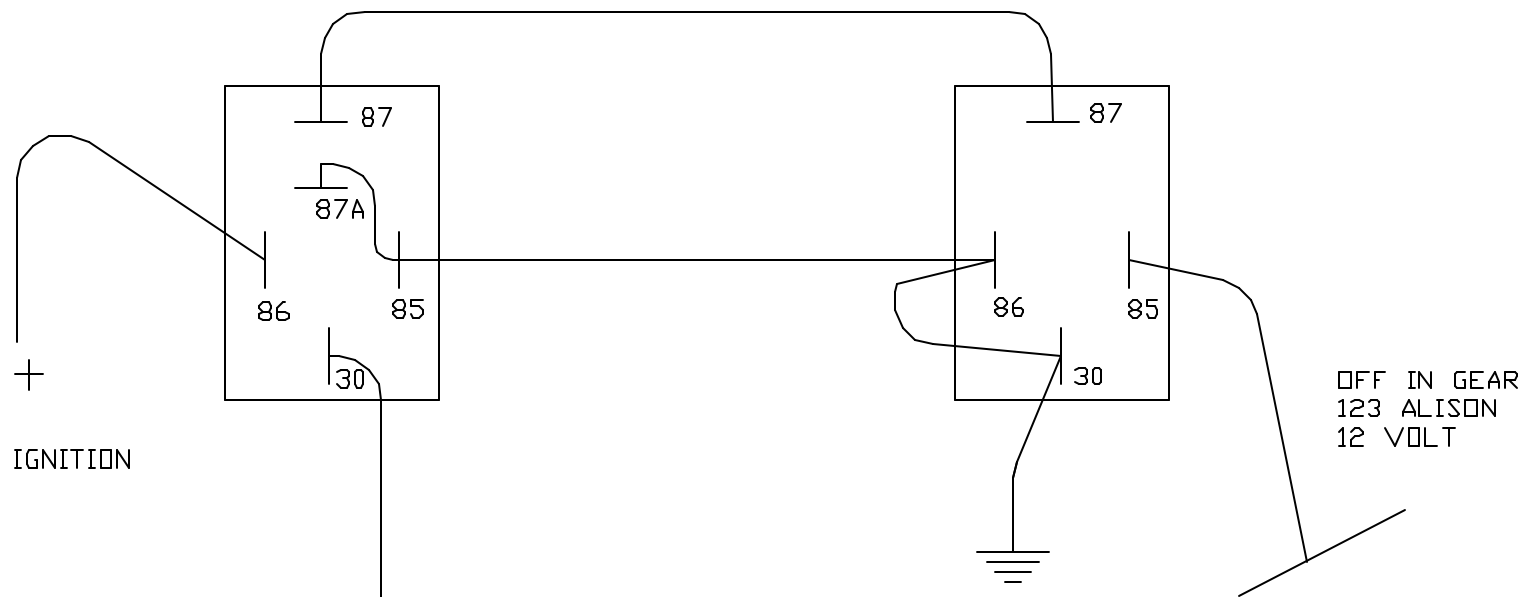


NO 30-87
85 86 87
30

MEDTEC
A PIERCE COMPANY

SCALE: 1" = 1"	APPROVED BY: Herman Mullet	DRAWN BY: PSP
DATE: 8/23/01	REVISED:	
PART NAME: MEDTEC RELAYS		
		DRAWING NUMBER: 19-20

19-21

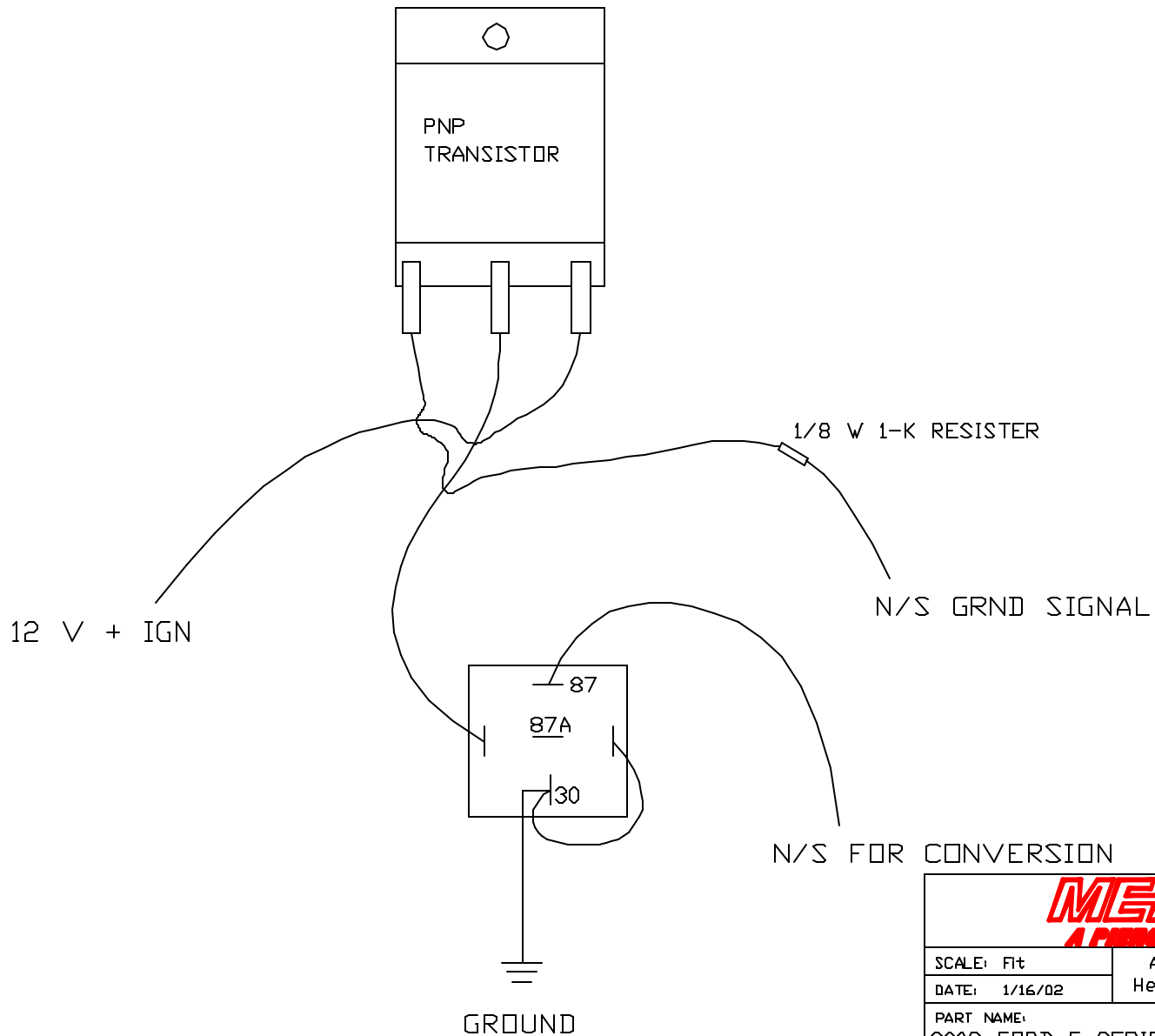


N/S
THROTTLE
TO FRONT SW PANEL &
ELECT. CAB.

MEDTEC
A PIERCE COMPANY

SCALE: 1:1	APPROVED BY: Herman Mullet	DRAWN BY: PSP
DATE: 8/23/01		REVISED:
PART NAME: FREIGHTLINER, KW, PETERBUILT N/S TIE IN		
		DRAWING NUMBER: 19-21

19-22



MEDTEC
A PERSEE COMPANY

SCALE: Fit	APPROVED BY: Herman Mullet	DRAWN BY: SEB
DATE: 1/16/02	REVISED:	
PART NAME: 2002 FORD F-SERIES NEUTRAL SAFETY HOOKUP		
		DRAWING NUMBER: 19-22.DWG

19-23

TIRE CHAIN
LOCK OUT SW

CONSOLE
PWR

40 AMP. BREAKER IN
SEAT BASE

COMPRESSOR

SW

SOL.

AIR
TUBE

AIR TANK

MEDTEC
A FIERCE COMPANY

SCALE: FIT

DATE: 2/20/02

APPROVED BY:
Herman Mullet

DRAWN BY: SEB

REVISED

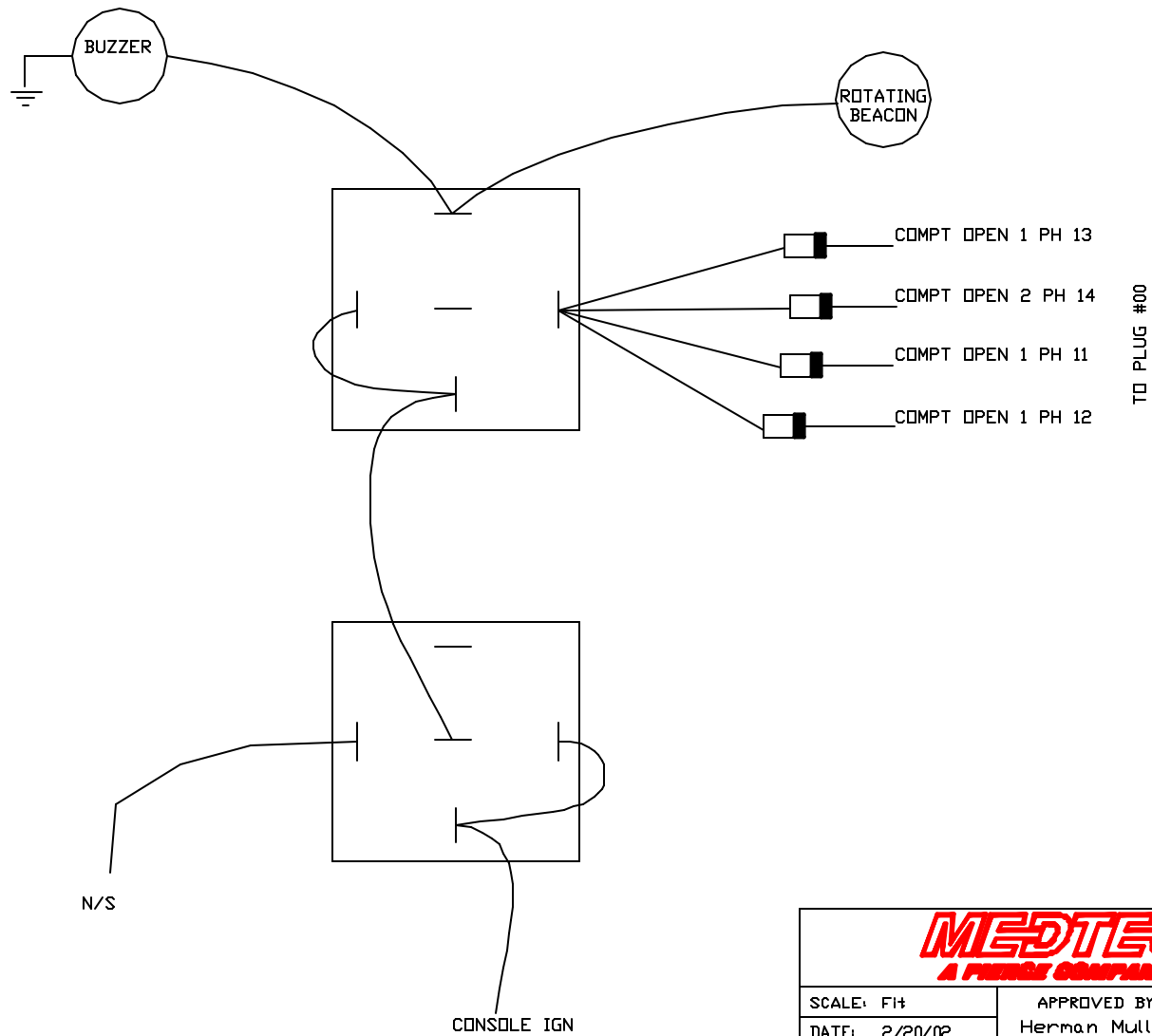
PART NAME:

TIRE CHAINS

DRAWING NUMBER:

19.23.DWG

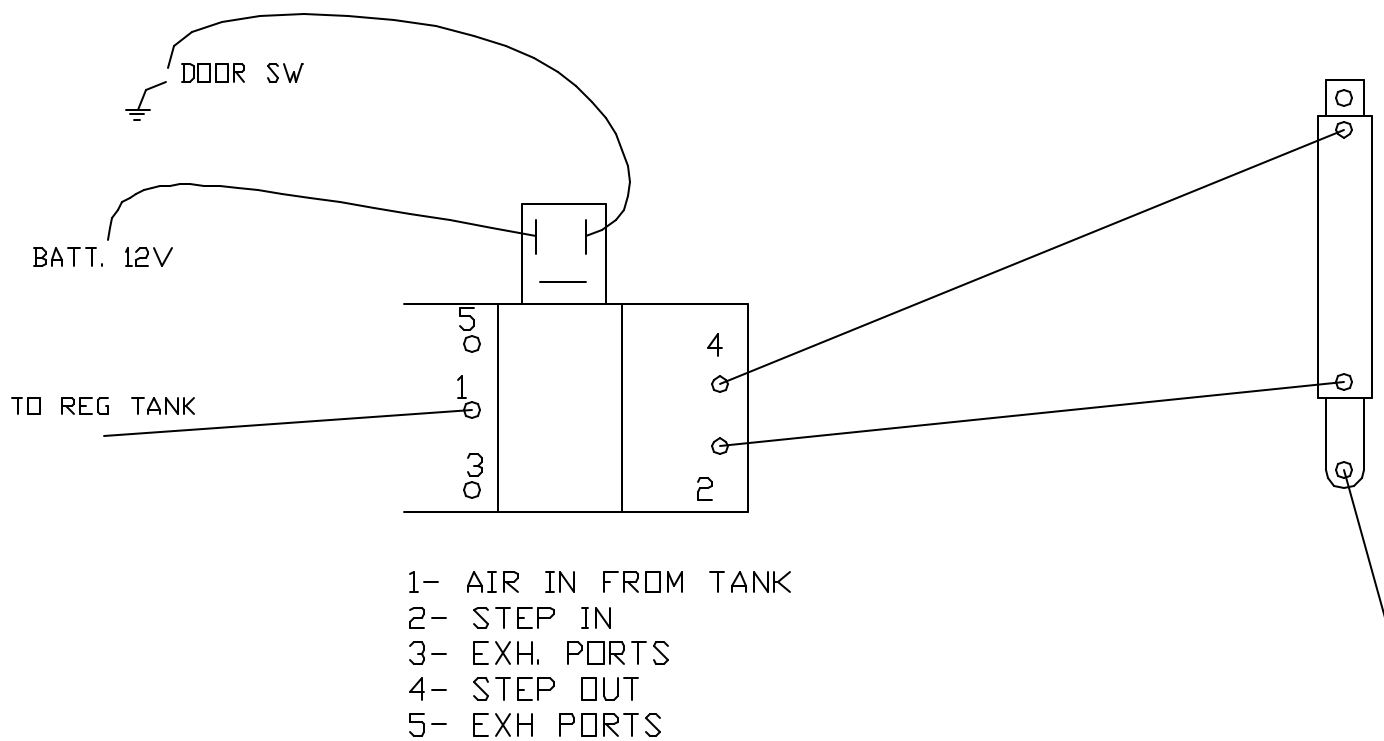
19-24



MEDTEC
A FERRIS COMPANY

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 2/20/02	Herman Mullet	REVISED:
PART NAME:		
COMPT. + ENTRY DOOR OPEN IN GEAR		
	DRAWING NUMBER:	
	19-24.DWG	

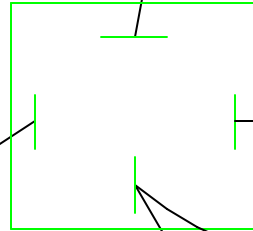
19-25



MEDTEC A PERCE COMPANY		
SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/6/02	Herman Mullet	REVISED:
PART NAME: AIR STEP		
		DRAWING NUMBER: 19-25.DWG

ANY EXTRA JUMP FROM N/S THROTTLE MUST COME FROM 87 PATON RELAY

14 GA ORANGE FROM
NEUTRAL SAFETY RELAY



18 GA ORANGE
NEUTRAL SAFETY
THROTTLE FROM
MOTOR

18 GA CONSOLE GROUND

MEDTEC™

SCALE: Fit

APPROVED BY:

DRAWN BY: SEB

DATE: 8/26/03

REVISED:

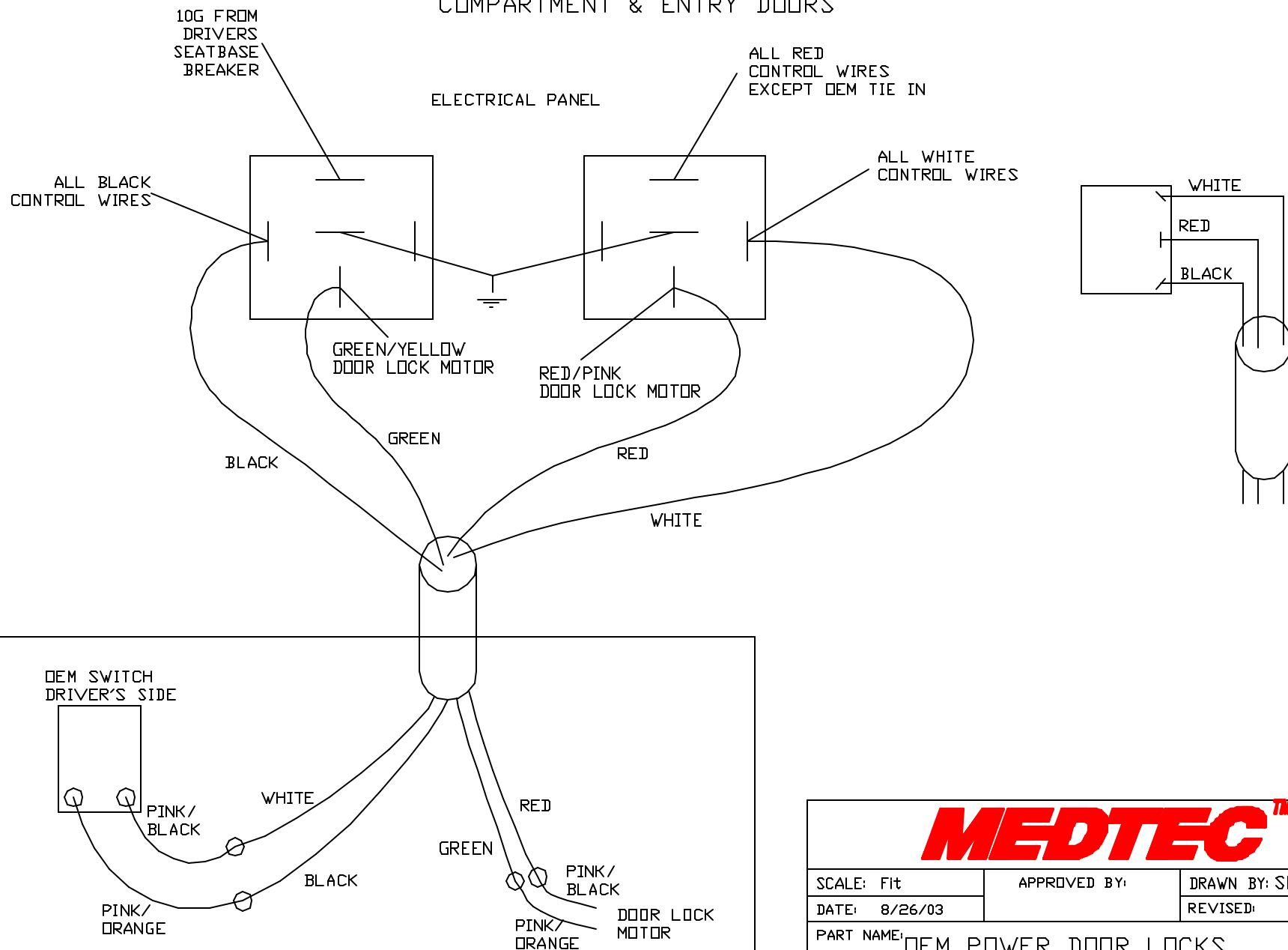
PART NAME: NEUTRAL SAFETY RELAY FOR INT

DRAWING NUMBER:
19-26

19-26

19-27

OEM POWER DOOR LOCK COMPARTMENT & ENTRY DOORS



NOTE: IF NO OEM TIE IN,
EVERYTHING IN BOX
DOES NOT APPLY

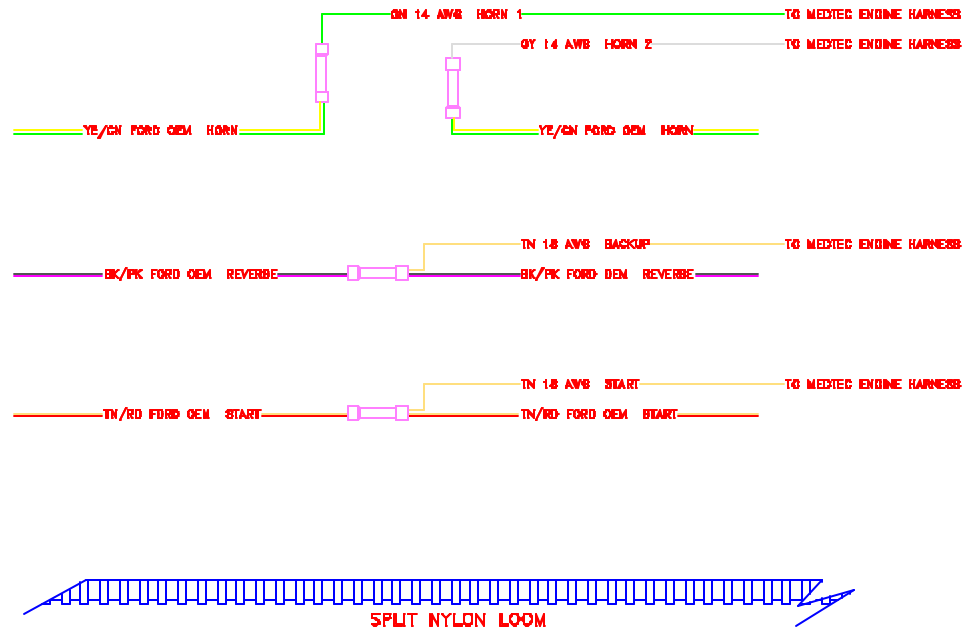
MEDTEC™

SCALE: Fit	APPROVED BY:	DRAWN BY: SEB
DATE: 8/26/03		REVISED:
PART NAME: OEM POWER DOOR LOCKS		
		DRAWING NUMBER: 19-27

19-28

REV	DATE	BY	ECN	REV	DATE	BY	ECN	REV	DATE	BY	ECN
A	-	-	-	-	-	-	-	-	-	-	-

TO FORD BATTERY JUNCTION
BOX (BJB) (14A003) UNDER
HOOD PASSENGER SIDE



TO FORD DEM WIRING
HARNESS (14B060) UNDER
HOOD PASSENGER SIDE

DO NOT SCALE	PROJECTION		DESCRIPTION		64007 US HWY 25 GOOMEN, IN 46026 Phone (874) 894-9931 Fax (874) 894-9929	
			ENGINE COMPARTMENT OEM TIE IN POINTS			
	SIZE		MODEL		REFERENCE	
	A		2004 Ford E Series		- 19-28.DWG	
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			$\pm 1/16$ ANGLE $\pm 1^\circ$		UNITS: NONE	
			UNLESS OTHERWISE SPECIFIED		SHEET 1 OF 1	
DRAWN: SAR			DATE: 04/28/04		PART NUMBER	
CHECKED: -			DATE: -		M-FE-00-00-01	
						REV. A